IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication JUNE 16, 1960

Lawrence S. Williams

* Pangborn Corp.'s Moore and Ball

Ultrasonics Cleans Strip Before Cold Rolling p. 119

Inventories: How Big a Factor? p. 81

Britain Goes After U.S. Markets p. 86

Digest of the Week p. 2-3

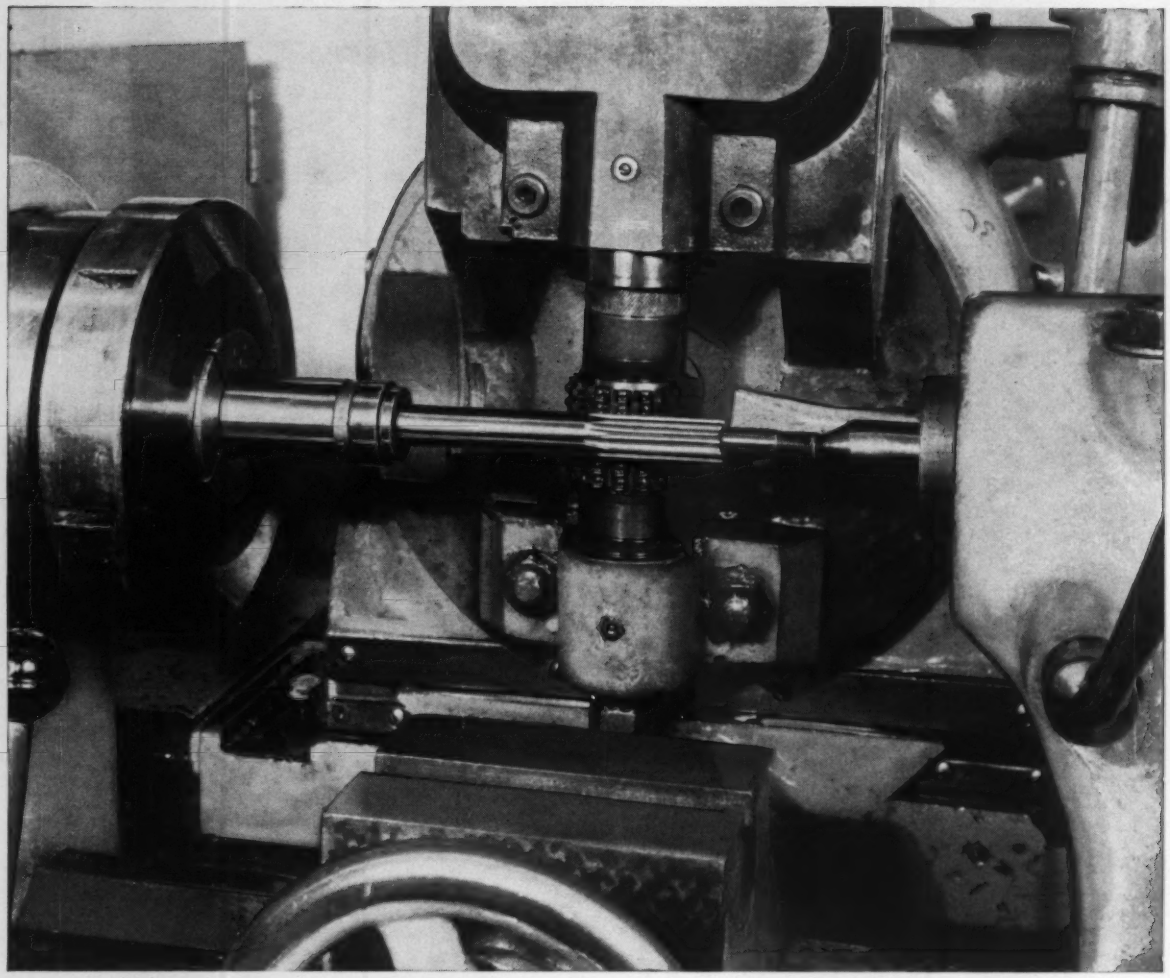
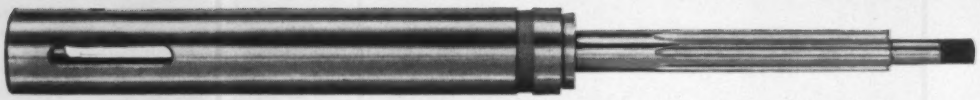


Photo courtesy Greenlee Bros. & Co.



Aristoloy Leaded Doubles Tool Life... Increases Feed 70% for Greenlee

ARISTOLOY STEELS

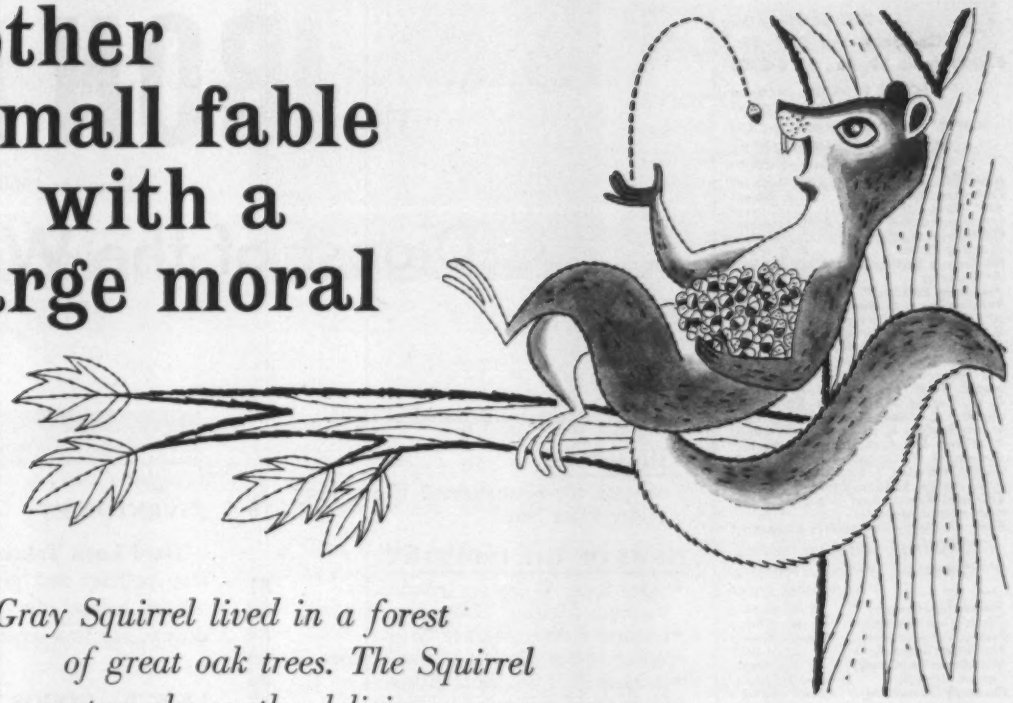
Two divisions of Greenlee Bros. & Co. switched to Aristoloy 4150 leaded. Faster machining—feeds and speeds boosted 60 to 70%—and improved surface finish were realized by the Machine Division on gears, spindles and shafts. Similar benefits were realized by the machine tool maker's Tool Division on machine bits, hydraulic rams, pistons and cylinders. Tool life was upped 200%, drastically reducing tool costs and eliminating hours of down-time for changes.

For complete information about free-machining Aristoloy leaded steels, call the Copperweld representative in your nearest large city. Write for booklet, "A Complete Line of Leaded Steels," or information on standard carbon, alloy and stainless grades.

COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

Another small fable with a large moral



A Gray Squirrel lived in a forest of great oak trees. The Squirrel dined sumptuously on the delicious acorns that grew high on the branches.

But one day a visiting squirrel told of another forest, quite far away, where the trees were not nearly so tall, and where the acorns were much easier to reach. The Gray Squirrel set out for those easy pickings in the distant forest. They were tasty indeed. On his third trip he met a Hungry Fox. End of story.

MORAL: Smart squirrels know it's wiser in the long run to gather acorns in their own back yard.

Whether your needs be acorns or steel, your safest, most reliable suppliers are right here at home. No one knows the needs of American steel buyers better than American steel makers. To serve you, and serve you well, is our primary concern—not just today and tomorrow—but year after year.

For quality steel of certified analysis, meeting the appropriate specifications, you can rely on Bethlehem Steel for such products as reinforcing bars, wire and wire products, pipe, structural shapes, plates, carbon bars . . . hot-rolled, cold-rolled, and galvanized sheets . . . transmission towers and other fabricated steel, wire rope, and industrial fasteners.

And remember, our engineers are on call to help you solve your steel-working problems.

Steel

for Strength . . . Economy . . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

THE IRON AGE
Chestnut and 56th Sts.
Philadelphia 39, Pa., SH 8-2000

GEORGE T. HOOK, Publisher

EDITORIAL STAFF

TOM C. CAMPBELL, Editor-in-Chief
GEORGE F. SULLIVAN, Editor
E. C. BEAUDET, Managing Editor
News-Editor R. D. Raddant
Technical Editor J. J. Obrzut
Asst. News Editor H. R. Neal
Machinery Editor R. H. Eshelman
Metallurgical Editor C. L. Kobrin
Welding Editor R. R. Irving
Nonferrous Editor—N. Y. F. J. Starin
Art Director T. S. Peaby
Associate Editors: P. J. Cathey, W. N. Redstreake, J. D. Baxter, R. J. Radomski. Assistant Editors: M. J. Tatich, G. C. Sekula. Regional Editors: K. W. Bennett, Chicago; T. M. Rohan, Cleveland; A. E. Fleming, Detroit; R. R. Kay, Los Angeles; G. J. McManus, Pittsburgh; G. H. Baker, R. N. Regeimbal, R. W. Crosby, Washington. Correspondents; F. L. Allen, Birmingham; N. Levenson, Boston; R. E. Koebbe, St. Louis; J. Miller, San Francisco; R. Kazarian, Buffalo; D. R. Coughlin, Seattle; A. T. Collins, Houston; F. Sanderson, Toronto; F. H. Harley, London, England. Chilton Editorial Board: Paul Wooton, Washington representative.
Robt. Gunning—Readability Consultant

WASHINGTON EDITORIAL OFFICE
Washington 4.....National Press Bldg.

BUSINESS STAFF
Marketing Manager R. H. Groves
Circulation Manager W. M. Coffey
Production Manager Warren Owens
Promotion Manager R. A. Wilt
Mkt. Research Manager G. V. Shanno
Census Manager William Laimbeer
Research Consultant Oliver Johnson

REGIONAL BUSINESS MANAGERS
*Denotes editorial office also
Atlanta 3.....J. W. Sangston
32 Peachtree St., N. E. Jackson 3-6791
*Chicago 1...T. H. Barry, W. R. Pankow
360 N. Michigan Ave. Randolph 6-2166
*Cleveland 15, R. W. Watts, R. L. White
930 B. F. Keith Bldg. Superior 1-2860
Columbus 15, Ohio....Harry G. Mumm
LeVeque-Lincoln Tower Capital 1-3764
Dallas 6.....W. J. Smyth
189 Meadows Bldg. EMerson 8-4751
*Detroit 2.....W. J. Mulder
103 Pallister Ave. Trinity 1-3120
*Los Angeles.....R. Raymond Kay
1920 Strand
Manhattan Beach Faculty 1-5306
*New York 17...C. T. Post, I. E. Hand
100 E. 42nd St. Oxford 7-3400
*Philadelphia 39—
B. L. Herman, J. A. Crites, W. E. Carr
Chestnut & 56th Sts. Sherwood 8-2000
*Pittsburgh 19.....T. M. Fallon
1707 Frick Annex Bldg. Atlantic 1-1830
San Francisco 3.....Don May
1355 Market St. UNderhill 1-9737
W. Hartford 7.....Paul Bachman
62 LaSalle Rd. Adams 2-0486
England .....Harry Becker
15 Gratton St., Altrincham, Cheshire
J. H. Kofron.....Chilton Research Dir.

A Chilton Publication

CHILTON OFFICERS & DIRECTORS
G. C. Buzby, President
Vice-presidents: P. M. Fahrendorf, L. V. Rowlands, G. T. Hook, R. E. McKenna; Treasurer: W. H. Vallar; Directors: M. E. Cox, F. P. Tighe, E. B. Terhune, Jr., R. W. Case, Jr., C. A. S. Heinle, J. H. Kofron. Comptroller, Stanley Appleby. Indexed in Applied Science & Technology Index and Engineering Index.

Copyright 1960 by Chilton Company

THE IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Second class postage paid at Philadelphia, Pa. Price to the metalworking industries only or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $25; other Foreign Countries, $35 per year. Single Copies 50¢. Annual Review Issue $2.00. Cable: "Chilton," Philadelphia

The IRON AGE

June 16, 1960—Vol. 185, No. 24

Digest of the Week in

*Starred items are digested at right.

EDITORIAL

Anyone for Khrushchev? If So, They Are Plain Nuts! 7

NEWS OF THE INDUSTRY

*Sales Snap Whip on Inventories 81
Vacuum Melting Gives Pure Silicon 83
*Leisure Goods Market Grows 84
*Wage Jumps To Hit Product Lines 85
*Britain Bids for More Business 86
*How to Hot Work Molybdenum 88
*Aluminum Pours Into New Homes 89
The IRON AGE Salutes 93

ENGINEERING-PRODUCTION

*Effective Steel Strip Cleaning 119
*Rocket Chambers Use Stainless 122
*Nuclear Unit Detects Moisture 124
*Conveying Huge Castings 126
*Central Lube System Cuts Costs 128
*Automatic Gaging Inspects Parts 130
Hard Facing Saves Valve Seats 133
X-Ray Gage Sorts Sheet Stock 134

NEWS ANALYSIS

Newsfront 9
Report to Management 95
Automotive 97
*Washington 101
*West Coast 103
Machine Tools 105

MARKET AND PRICE TRENDS

Market Planning Digest 79
*The IRON AGE Summary 161
*Purchasing 162
Iron and Steel Scrap Markets 166
Nonferrous Markets 170

REGULAR DEPARTMENTS

Letters From Readers 11
Fatigue Cracks 13
Industrial Briefs 106
Men in Metalworking 109
Patent Review 136
Free Literature 138
Design Digest 143
New Equipment 148
Clearing House 180

INDEX TO ADVERTISERS 184

News of the Industry

INVENTORIES

Hard Look Taken—Tight inventory policies and practices are not villains behind idle capacities in industry, say four experts. P. 81

LEISURE GOODS MARKET

Sales for Metalworking — Manufacturers are discovering the sales potential in the leisure goods mar-

ket. About half the $40 billion spent each year on recreation goes for products in which metalworking has a part. P. 84

WAGE HEARINGS

Appeal Made — Industry members of structural steel, machine tools and metal business furniture appeal wage minimums set by Labor Dept. The department set wage minimums for work on government contracts. P. 85

BRITISH EXHIBITION

Best of Friends—The U. S. and Great Britain are close friends.

Metalworking

Cover Feature

STRIP CLEANING: Ultrasonics is teaming up with shotblasting to prepare steel strip for subsequent cold forming. At Hagerstown, Md., Pangborn Corp.'s Ralph Moore (left) and R. G. Hall are pleased with the excellent results. P. 119

They're also the best customer for the other's exports. And Britain is showing its best and latest products at a trade fair in New York P. 86

WASHINGTON

Credit Eased — The administration has eased credit and boosted defense money. P. 101

Engineering-Production Developments

STAINLESS RIBBON

For Rocket Chambers—The missile and rocket fields are putting stainless steel through the paces to gain complex designs for component parts. Stainless ribbon is formed and brazed to make tube-like passages for rocket thrust chambers. The end product is used to test missile fuels for space vehicles. P. 122

MOISTURE DETECTION

In Foundry Sand—A new instrument checks the moisture content of foundry sand. Using a radioactive fast-neutron source, it measures the moisture in a 3200-lb sand charge to an accuracy of ±0.05-pct moisture content at the 3-pct level in less than one minute. The gage provides safe operation. P. 124

MOVING HUGE CASTINGS

Along Free Track—One of the principal manufacturers of railroad castings uses a "power and free" conveyor system to reduce production costs. With side-by-side conveyors, the system speeds parts weighing up to 930 lb. A free track connects processing stages. P. 126

CENTRAL LUBE SYSTEM

A Cost Cutter—Five lubricating systems combine to keep machines operating in a high-speed rod mill. The systems, circulating 45,200 gal of oil at 556 gpm, involve five changes in viscosity and two major changes in pressure. P. 128

AUTOMATIC GAGING

For Quality Control—The modern way to make use of quality control is to insert inspection right into the production program—100 pct of the time. A truck engine plant is doing just this with automatic gaging. P. 130

Market and Price Trends

INERT FABRICATION

Used for Hot Working — Molybdenum and other metals can now be hot worked without contamination. Process uses large chamber filled with argon gas. P. 88

NEW MARKET

Going Up—The urban renewal projects across the country are opening a new and big market for aluminum. Here's how Reynolds Metals Co. is taking advantage of it. P. 89

WEST COAST

What Compacts Mean—Auto assembly has always been important to the West Coast economy. Now assembly of compact cars there will mean more business. P. 103

STEEL SUMMARY

Still Going Down—Steel operations are still on the decline. Little improvement can be expected much before late summer or early fall. P. 161

PURCHASING

Quick Availability — A buyer's market has developed in the bearings market in the last two months. Prices look stable, also. P. 162

NEXT WEEK

CAPITAL GOODS OUTLOOK

Second Half—Most metalworking companies boosted plans for new plant spending in the second half of the year. Details for some 37 industries are reported in The IRON AGE's survey of capital appropriations.

RADIAL DRILLING

With Tape Controls—Can tape controls be used to advantage on a variety of short runs? Next week's issue will feature an article on a fast, accurate machine that more than cuts conventional costs in half on such runs.

Experience—*the added alloy in* **Allegheny Stainless**

form
Stainless steels can be bent, drawn, and roll-formed by all the standard techniques known in the metalworking industry. In these operations, stainless requires somewhat greater power and harder tools than it takes to work softer materials. But this characteristic stems directly from stainless steel's superior ability to withstand bending and denting in service.
This attractive stainless cocktail set was produced by flow-turning—one of the newer metalworking techniques that
have been developed to offer new answers to many design problems. With these improved fabricating techniques, components that formerly called for two or more materials can often be made better or more economically from one solid material that fills all the requirements of design. The techniques of spinning and abrasive wheel polishing offer special design possibilities, as exemplified by the spun dish on page 7. For further information on the degree of forming possible with a specific type of stainless, contact your nearest A-L office.
Stainless Cocktail Set
Stainless Auto Heaters

Sample pages from A-L's new free booklet on design

"Design and Allegheny Stainless" is illustrated page after page with hand-picked examples of good design in the gleaming metal.

Twenty-four photographs and drawings in full color, twenty-six in dual color and black and white become a showcase of the versatility of stainless.

The examples are presented with text in terms of Function, Shape, Texture and Color. They cover many fields from automotive parts to holloware for the home . . . to open new horizons for the designer.

There is a working outline of types and properties in the many grades of Allegheny Stainless. Some of the new textures illustrated will interest the designer looking for new effects.

Write for your copy of "Design in Allegheny Stainless Steel"—without cost or obligation. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. IA-6-3.*

Packed with actual examples of good design—and ideas for future applications

ALLEGHENY LUDLUM

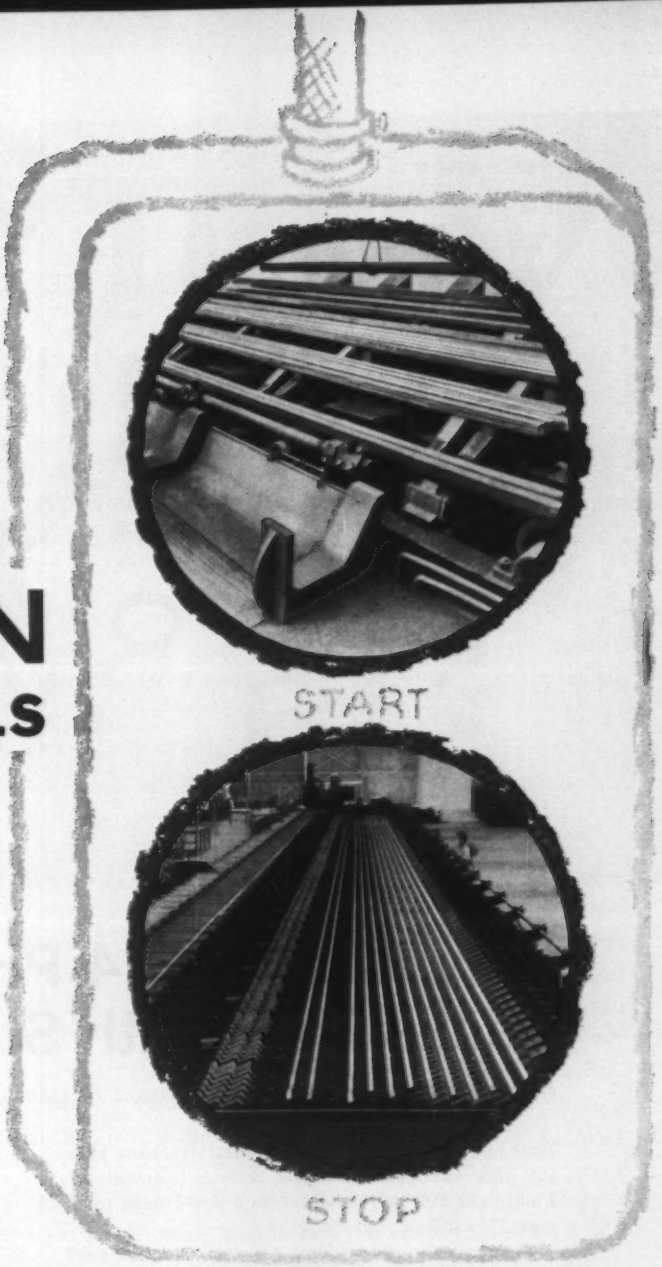
Export distribution: AIRCO INTERNATIONAL

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

AL

884

experienced engineering from the start of MORGAN ROLLING MILLS



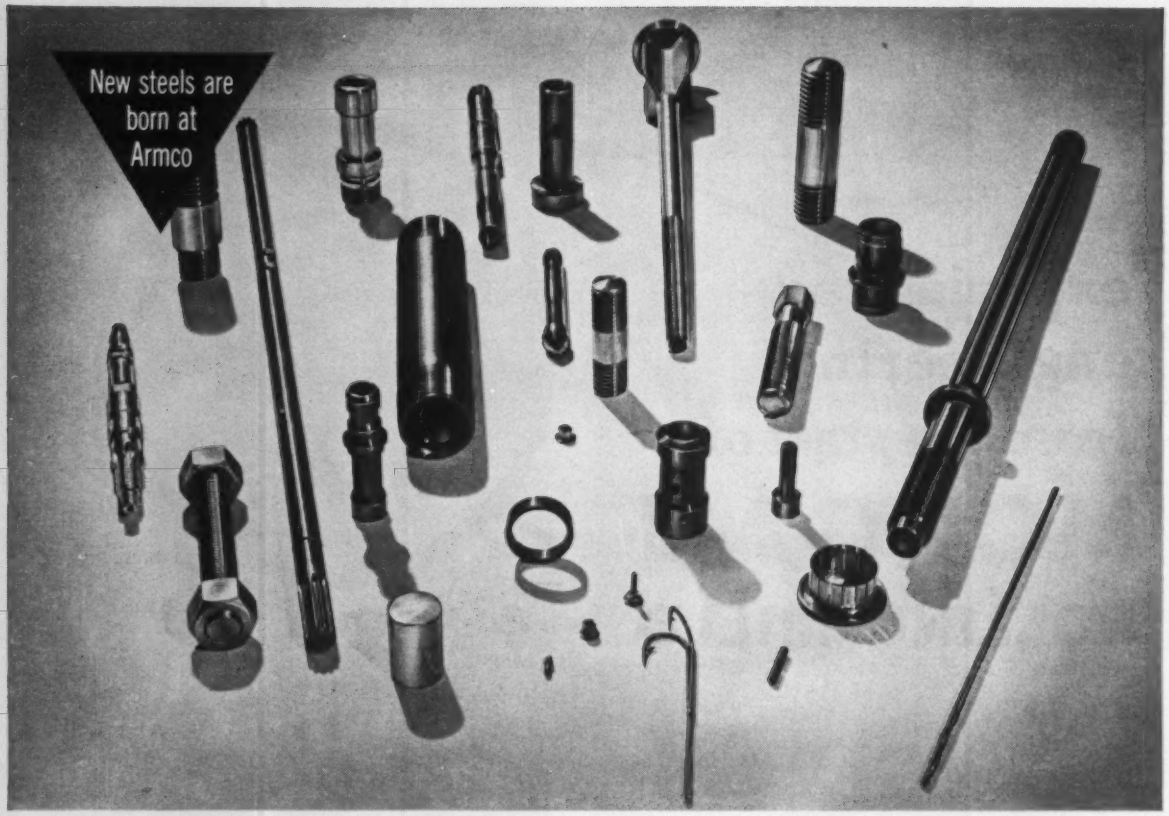
Morgan starts with the foundation and effectively covers every function of the mill from start to finish. Seventy years of experience in the rolling mill field have given Morgan a wealth of background and know-how without equal in quality and performance of mills.

Write for our booklet which demonstrates the fact that Morgan is a leader in the rolling mill field.

MORGAN WORCESTER

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS

ROLLING MILLS • MORGOIL BEARINGS • GAS PRODUCERS
WIRE MILLS • EJECTORS • REGENERATIVE FURNACE CONTROL
RM-77



Why Armco 17-4 PH Stainless Steel Packs Parts with Stamina

Stronger than Type 416; Corrosion resistance in the class of 18-8

Fabricate parts from 17-4 PH stainless steel bars. Then get high strengths (Ultimate tensile: 200,000 psi; Yield: 185,000 psi) by short-time 900 F heat treatment. No scaling. No distortion.

Economical parts made of Armco 17-4 PH are not only harder and stronger, but much more resistant to corrosion than those of Types 410 or 416. They are comparable in many applications to 18-8 stainless grades in corrosion resistance and superior in some.

Armco 17-4 PH stainless steel bars and wire, for shafts, valves, fasteners, and similar strong, corrosion-resisting parts, are readily available through Armco Sales Offices and steel service centers of Armco Stainless Distributors. Call one of them today, or mail the coupon for more data.

Identify durable stainless products with the STEELMARK.

Stainless Steel

ARMCO STEEL CORPORATION
2000 Curtis Street, Middletown, Ohio

Send more data on Armco 17-4 PH Stainless.

NAME .....

TITLE .....

STREET .....

CITY ..... ZONE .....

STATE .....

ARMCO STEEL

ARMCO

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Anyone for Khrushchev? If So, They Are Plain Nuts!

Mr. Khrushchev's yen for fouling his own nest is a lifesaver for us. Every time a few million do-gooders and as many more scared cats start to think "maybe he ain't so bad" Mr. K explodes that myth.

It is quite perplexing to see—year after year—people in high and low places believing you can really trust the Reds. You can't. Disraeli knew a 100 years ago that you could not believe the Russians. Add the Red formula to that history and you have a double-barreled sense of fables, myths and lies.

There are many who say that Mr. K's outbursts are coldly calculated. Let's assume they are. They still reflect a slightly unbalanced man bent on dominating his party and through it the world.

It doesn't make any difference whether he lasts or not. He may get his come-uppance from the same stripe of guys in the back room. If he does, we will get another carbon copy to deal with. It can't be any different if you know and understand the commie mind and goals.

We have the cold war in earnest again. But we had it when many of us thought we didn't. It will never cease. That doesn't mean we will have to fight a nuclear war soon—or even at all. It means simply that we have to call some of their bluffs, laugh at others, and cooperate more than ever with our allies—and stay strong.

Certainly we can't afford to be alone in the world. It is pretty clear that, while our defenses are better than expected, all free nations need each other's support. Fortunately, Mr. K and Co. adequately take care of this by showing why.

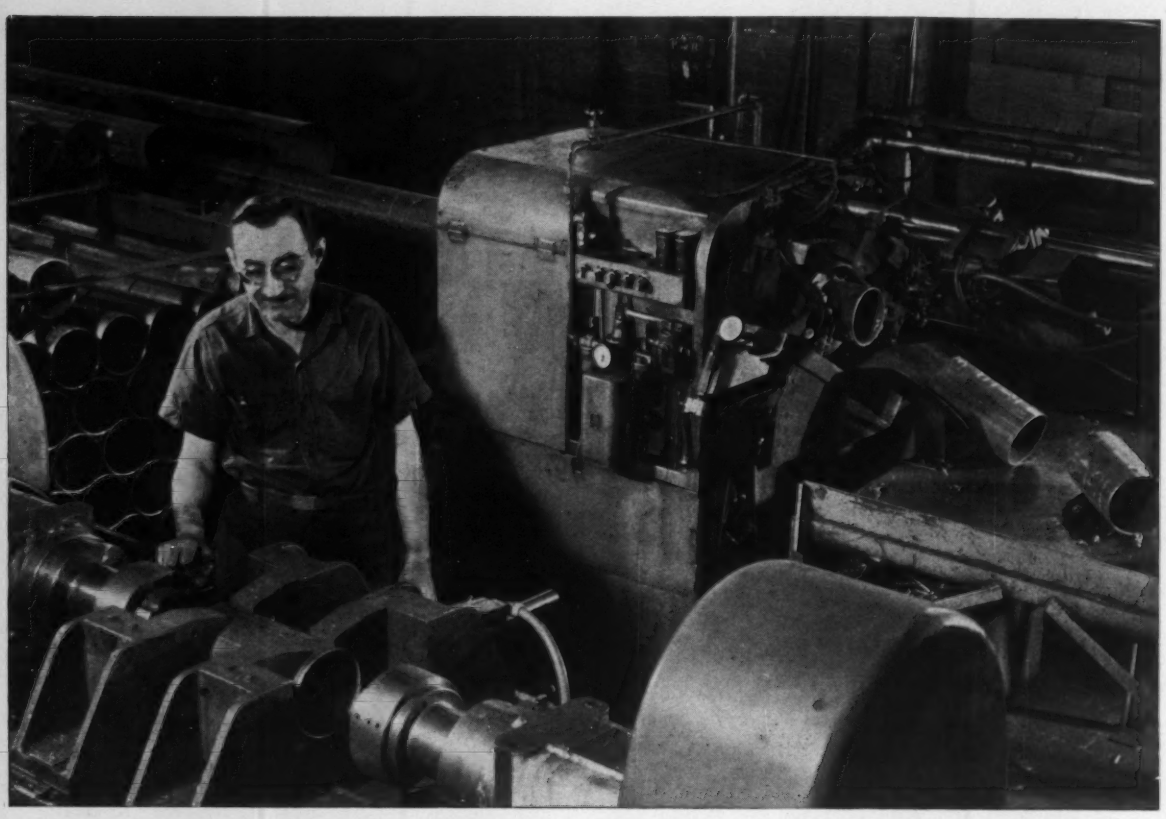
Some long-hairs and people like Mr. Stevenson are off the beat. They had better get it through their heads that the man on the street will not stand by and see our President sullied by a Red blackguard.

When the President can rally around him not only his own people but tough-minded and savvy men of the opposite party, the signal is clear—or ought to be. You just can't—especially if you are a Red—tamper with the reputation or person of the President of the United States.

And that is as it should be. The number of naive idealists who see anything good in Mr. K is growing smaller. Those who insist that he may change are plain nuts!

Tom Campbell

Editor-in-Chief



Tubing for this job must meet the most rigid specs

This manufacturer of heavy-duty idler rollers has turned to increased automation and tighter material specs to improve production. Note automatic feed and cutoff of tubing in background . . . the quick setup for double-end counterboring at the next station.

Tubing for this job must meet highest standards for uniformity of size, straightness and close tolerance of concentricity. But where do you find large O.D. tubing to meet these rigid specs? At Ryerson, of course—home of the industry's tightest quality controls.

Here you choose from the nation's largest stocks. And you're assured of consistent quality that is so important to meet the demands of automation. The more automated your production line, the less chance for visual inspection, and the more dependent you are on the consistent quality of the raw material.

So when you next need tubing or help with selection and application problems, be "Metalogical"—call Ryerson.

The type of tubing you need is here

Carbon Steel Tubing—seamless and welded, round and square, cold drawn and hot finished.
Alloy Steel Tubing—seamless rounds.
Fluid Power Tubing—Rockrite cylinder finish, seamless and welded; hydraulic fluid line; seamless and welded cylinder tubing.
Structural Tubing—square, rectangular and round.
Ledloy® 170 Tubing—fast machining, 170 sfm.
Stainless Pipe and Tubing—cold drawn seamless and welded. Also welded ornamental.
Aluminum Pipe and Tubing—all commonly used alloys and tempers.
PVC Pipe and Tubing—time-tested Ryertex®-Omicron PVC.

METALOGICS
RYERSON PLUS VALUE®

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

PLANT SERVICE CENTERS: BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • HOUSTON • INDIANAPOLIS
LOS ANGELES • MILWAUKEE • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • SPOKANE • WALLINGFORD

Process Extends Roll Life

Seamless, homogeneous curing of Teflon to steel, aluminum and bronze rolls—in thicknesses to 0.03 in.—increases roll life. And, it eliminates the problems associated with sprayed-on Teflon, such as peeling and rapid wear. The new Teflon roll covers can even be reground. Adhesion to metal is so complete that the Teflon tears rather than loosening at the bond.

Grind Miniature Bearings

Grinding wheels almost as small as a common house fly's eye operate at speeds up to 40,000 rpm. These wheels promise to save producers of miniature devices thousands of dollars annually. They are 5-pct less expensive than the implements they replace. Uses include: grinding miniature ball bearings for high-speed cameras, tape recorders, missile guidance systems and other micro-miniature devices.

Press Molds at 2200°F

Where other materials failed to complete one firing cycle, press molds of Hastelloy alloy X have just passed the 70-cycle mark. This represents 280 hours at 2200°F—while under 9 tons of pressure. Operation involves the firing of a 6 sq in. mass of ceramic block. These blocks serve in electronic equipment.

Atom-Powered Rockets

With little fanfare, the U. S. is moving ahead on research aimed at an atom-powered rocket motor. Research will have to begin at the basic stages. One of the results will be atomic reactors that are able to operate at core temperatures exceeding 4000°F.

Longer Crankcase Service

Cavitation-erosion in the water-seal area of aluminum crankcases is eliminated by a wide-band cylinder liner. The liner also serves as a water seal. Most serious problem centered on a non-magnetic, lightweight, 600-hp naval diesel engine. Some of these crankcases failed due to water leakage after only 350 hours of operation. Use of fabric inserts and touch-seal materials produces seals that are usable for at least 3000 hours.

Quencher Improves Steels

Tests with aqueous solutions of polyvinyl alcohol show it has promise as a quencher in hardening steels. It produces new hardness ranges for many of the newer alloys. It also spans the range between water and oil. Advantages over water are reduced cracking and distortion. Advantages over oil include: lower cost, reduced processing, no fire hazard.

Safety Suit Resists 3000°F

Asbestos safety clothing sheds molten metal at 3000°F without deterioration, resiliency loss or discoloration of the inner side. Called Thermogarb, the woven fabric offers 40- to 50-pct greater abrasion resistance than ordinary asbestos. And it's reported to have nearly double the tensile strength of fabrics twice its weight and thickness.

Collapsible Oil Tanks

Large, collapsible tanks made of rubberized fabric store oil during periods of repair and routine overhaul for major power companies. Hundreds of gallons of oil must be drained from substation circuit breakers and transformers before any work can be done on their integral parts. A "pillow tank", compactly rolled and carried in a small truck, provides a practical answer to the problem.

Columbium-Base Alloys

Columbium alloys containing tungsten and titanium provide oxidation resistance to 2550°F. They also exhibit good mechanical properties. Columbium-base alloys containing aluminum and vanadium permit a hundredfold reduction in the oxidation resistance of pure columbium. At the same time, the latter alloys retain inherent low-neutron cross section—and they improve mechanical properties.

Truckloads, carloads, part loads—

Get small heads from COMMERCIAL...fast!

We'll load to best suit your receiving facilities—crane, lift truck or manual.

COMMERCIAL daily ships small tank heads 6" diameter and larger—one head or a full load—to tank builders nationwide. COMMERCIAL has a complete range of sizes—all the standards, many specials. Many rush requirements are shipped right out of stocks available at Youngstown, Ohio, Chicago, Ill., and Salt Lake City, Utah.

Heads can be furnished for code or non-code pressure vessel construction. Available shapes include flanged and dished, ellipsoidal, hemispherical, flanged only, double dished and obround.

COMMERCIAL heads are economical to use. Precision formed in steel dies, they are consistently uniform, right on size. Flanges are straight—fit into shell easier—ideal for automatic welding. They have been preferred by better tank builders for over 30 years.

For full information on small tank heads, whether from stock for immediate delivery or made to your special order, write to Commercial Shearing & Stamping Company, Dept. K-25, Youngstown 1, Ohio.

Specialists in the shape of things to come

COMMERCIAL
shearing & stamping

LETTERS FROM READERS

School Days

Sir—I am presently conducting supervisory training classees for approximately 200 men, and would like to have permission to reprint the article "What Industry Must Do to Make Foremen Real Managers" which appeared in the June 2 issue.

I am sure our formen will find it of interest.—R. M. Ney, Training Supervisor, Mack Trucks, Inc., Allentown, Pa.

▪ **Permission granted.—Ed.**

Foreign Banking

Sir—On page 168 of The IRON AGE dated May 26 under the title "Suggestions Made," it was reported that some United States machine tool sellers have succeeded in securing aid from European banks for export credit.

We are manufacturers of heavy oil field equipment, and like machine tool dealers are seeing our former export markets slip away because of the demand for long term financing.

Could it be possible that you could put us in touch with someone who could advise which European banks have financed export credit deals for American exporters?—J. C. Rebman, Vice-Pres. and Treas., McEvoy Co., Houston, Texas.

▪ **Write to R. K. Vincent, executive director, Machinery Dealers National Assn., 1346 Connecticut Ave., Washington 6, D. C.—Ed.**

Sir—We like the article on the foremen very much and wonder if we might have additional copies.—A. Schwartz, Dir. of Public Relations, Opinion Research Corp., Princeton, N. J.

▪ **Copies are on the way.—Ed.**

Hot Item

Sir—We are interested in additional information on the Newsfront item entitled "Lubricates at 1000° F" as described in the May 19 issue of The IRON AGE.

Please supply the name and address of the vendor and additional information, if available .— A. M. Hoobs, Purchasing Agent, General Electric Co., Transformer Div., Hickory, N. C.

Sir—A brief item on page 9 of the May 19 issue describes High-Temp 2409 lubricant. We would appreciate receiving the name and address of the supplier of this material.—W. E. Ellerman, Technical Dept., The Dow Metal Products Co., Div. of The Dow Chemical Co., Madison, Ill.

Sir—We would appreciate very much your giving us the name and address of the manufacturer of High - Temp 2409 lubricant described on page 9 of The IRON AGE Newsfront for the May 19 issue. — J. C. Thompson, Chief Engr., Paxton Products, Santa Monica, Calif.

Sir—On page nine of the May 19 issue appeared an item on High-Temp 2409 which is a compound lubricant used in areas of high temperature.

Would you please advise where we may obtain further information on this product.—B. C. Kays, Purchasing Agent, Northwestern Steel & Wire Co., Sterling, Ill.

▪ **Write to Mr. Cook, E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.—Ed.**

"Every time I get a promotion it goes to her head."

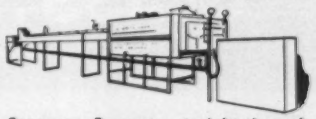
ED JOHNSON

Furnace Application Engineer, reports . . .

SINTERING GOES SCIENTIFIC

The effective bonding of powder metal compacts is dependent on precise sintering temperatures, and the properly reactive furnace atmosphere for each temperature range. To assure optimum results at lowest cost, Hayes offers both the *right* furnace and the *right* atmosphere for any sintering operation, whether you're working with ferrous, nonferrous, or refractory metals; stainless steel compacts; or cermets. Hayes furnaces and atmospheres suitable for research, high-temperature, or production sintering, include:

Type BA-M Pusher "Pilot Plant" Furnace. Controlled atmosphere heating and cooling . . . straight-through design. Manual or automatic operation to 2150° F.



Conveyor Furnaces straight-through LAC and Humpback BAC — for continuous, automatic, sintering to 2100°F. Zone temp control. Burn-off sections. For stainless steel, etc.

Type BA High-Speed Pusher Furnace — wide-temperature-range furnace for sintering to 2350° F. Available with automatic, electro-hydraulic pusher system for constant time / temperature cycles.

Type M-Y High-Temperature Furnace for uniform heating of ceramic and metal compacts at temps over 3000° F. Economical — use with reducing atmospheres for close-control research or full-scale production.

Model HT/HV Vacuum Furnace for high vacuum (0.1 micron), high temperature (3000° F plus) sintering special refractory metals—titanium, zirconium, tungsten, etc. High-speed heating and cooling cycles. Cold wall design, low voltage elements.

Atmosphere Equipment . . . ammonia dissociators; endothermic, exothermic, nitrogen, forming gas generators; Molecu-Dryers for drying protective atmospheres to —100° F D.P. Designed for controlled, dependable operation.

Use Hayes experience and equipment to insure a "Results Guaranteed" solution to *your* heat treating or protective atmosphere problem—to improve your product, reduce spoilage, or speed up production. Write for details.

C. I. HAYES, INC.

Established 1905

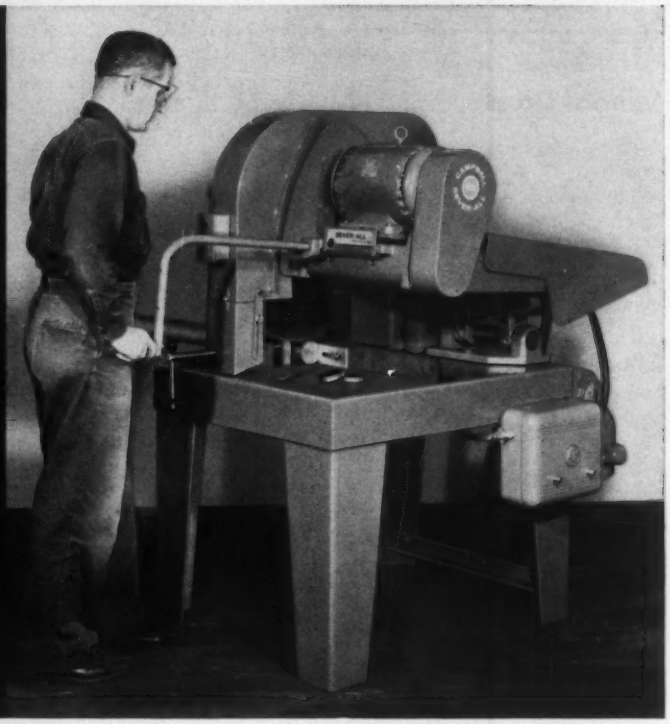
821 WELLINGTON AVE., CRANSTON 10, R. I.

ELECTRIC FURNACES

It pays to see HAYES for metallurgical guidance, lab. facilities, furnaces, atmos. generators, gas and fluid dryers.

NEW!

GREATEST CUT-OFF CAPACITY IN ITS CLASS!



• This newest addition to the Sever-All line of abrasive cutting machines—the Model 2-A—provides greater cutting capacity and more flexibility than any other machine in its class. Check these important advantages:

Big capacity • cuts 4″ round or square solids, 6″ diameter tubing or standard pipe, 6″ x 1″ flat stock, 6″ angle iron and 8″ channels. Cuts practically all metals.

Fast operation • accurate cuts at the rate of 2 to 3 seconds per square inch. For instance, you can cut a 4″ bar of hardened steel in 45 seconds, or a 2″ pipe in 3 seconds.

Power oscillation • oscillation—the forward and backward motion of the cutting wheel as it is fed down into the cut—gives you extra cutting capacity without excessive horsepower load on your power lines. It also contributes to longer wheel life and reduced operator fatigue.

Quality cuts • clean, smooth cuts, even on large sections, because wheel oscillation provides cooler cutting action.

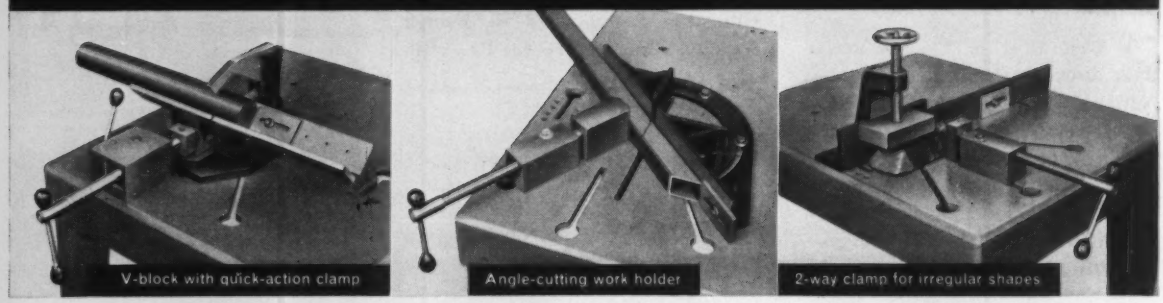
Economy • Sever-All abrasive cutting wheels, developed specially for the Model 2-A, assure you of lowest cost per cut.

Safe • wheel guard provides complete operator protection.

Minimum maintenance • all bearings are the pre-lubricated and sealed type. Clean, simple machine design permits easy housekeeping.

Built to last • rugged machine bed and rigid castings make the Model 2-A first choice for heavy-duty jobs.

VARIETY OF WORK HOLDERS GIVES UNUSUAL VERSATILITY



V-block with quick-action clamp

Angle-cutting work holder

2-way clamp for irregular shapes

Choose the work holders you need from several optional arrangements. These include the vise-type holder shown on the machine at top, plus the V-block, angle-cutting and 2-way clamp fixtures above. All fit interchangeably on the Model 2-A Sever-All. Screw-type and quick-action clamping also may be used interchangeably.

***Write for details** on the new Model 2-A Sever-All abrasive cutting machine. Ask for Bulletin DH-299*

ACCO

SEVER-ALL ABRASIVE CUTTING MACHINES

Allison-Campbell Division, American Chain & Cable Company, Inc.

927 Connecticut Avenue, Bridgeport 2, Conn.

Long Look Ahead

No industry can offer more challenge—or more uncertainty—than missile-age metalworking.

Both the problems and the solutions are king-sized in scope. You'll find out how one company, Universal-Cyclops Steel Corp., solved the tough problem of hot working metals like molybdenum in the story on p. 88.

Faith Alone—The need for creative thinking in meeting space-age metal problems is underscored by C. T. Evans, Jr., technical vice president for U-C. Describing the early days of this Infab process, he says, "Imagination is more important than knowledge. Much of this was done on faith."

Another problem is lead time. N. E. Promisel, chief materials engineer for the Navy's Bureau of Weapons, who helped develop the process, points this out.

Electrical propulsion systems for space travel look like one of the big applications for refractory metals. It will probably be at least 10 years before they are in the construction stage.

"But," says Mr. Promisel, "it will also take 10 years to develop the metals and methods needed for building these systems."

Planning Ahead

Are you going to the Machine Tool Exposition in Chicago this September?

If you are, the National Machine Tool Builders Assn. has published a visitors' information booklet that will make your visit uncomplicated and enjoyable. It contains information about everything you'll want to know including: Dates, hours, transportation, hotel rooms, registration cards, inquiry time saver plate application forms—everything you'll need to make arrangements for the exposition.

The exposition will run from Sept. 6 through Sept. 16. Hours are from 10 a. m. to 5:30 p. m. daily. Production Engineering Show hours are from 1 p. m. to 10 p. m. daily.

The booklet is available free of charge by writing to National Machine Tool Builders Assn., 2139 Wisconsin Ave., N. W., Washington 7, D. C.

Early Vintage

Sixty-some years ago neighborhood kids could pick up extra pocket money shining the cuspidors in the saloons around the corner. That was in the era when the cuspidor was a prominent and important fixture next to the bar rail.

EARLY TIMES: A cuspidor makes a good companion at the rail.

We don't know if this business will start up again, but the cuspidor is on the way back, according to one metalworking firm.

Fostoria Corp., Huntingdon Valley, Pa., is now marketing solid brass cuspidors of Gay Nineties vintage. But a few new uses have been suggested to make them more acceptable to the lady of the house.

Besides being good for the atmosphere of the home bar, they can be used as vases or decorative pieces. And they're suggested as a gift for the man "who has everything."

CAR HEARTH FURNACES
FOR
HEAT TREATING
STRESS RELIEVING
ANNEALING
HOMOGENIZING
600° F TO 2500° F

DIRECT FIRED OR FORCED CONVECTION, OIL, GAS, ELECTRIC

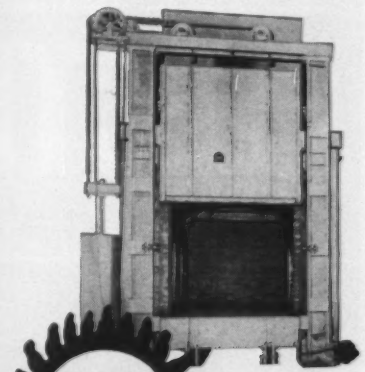
R-S CAR HEARTH FURNACES are batch type furnaces with movable hearth for ease of loading and unloading. They can be designed to your specifications as direct fired units for temperature range from 1000° to 2500°F. or as forced convection units from 600° to 1600°F.

R-S CAR HEARTH FURNACES can be built to utilize oil, gas or electricity, whichever is the most economical for your plant. Whatever the charge weight, length or width required R-S engineers can design and build the furnace to meet your requirements most efficiently.

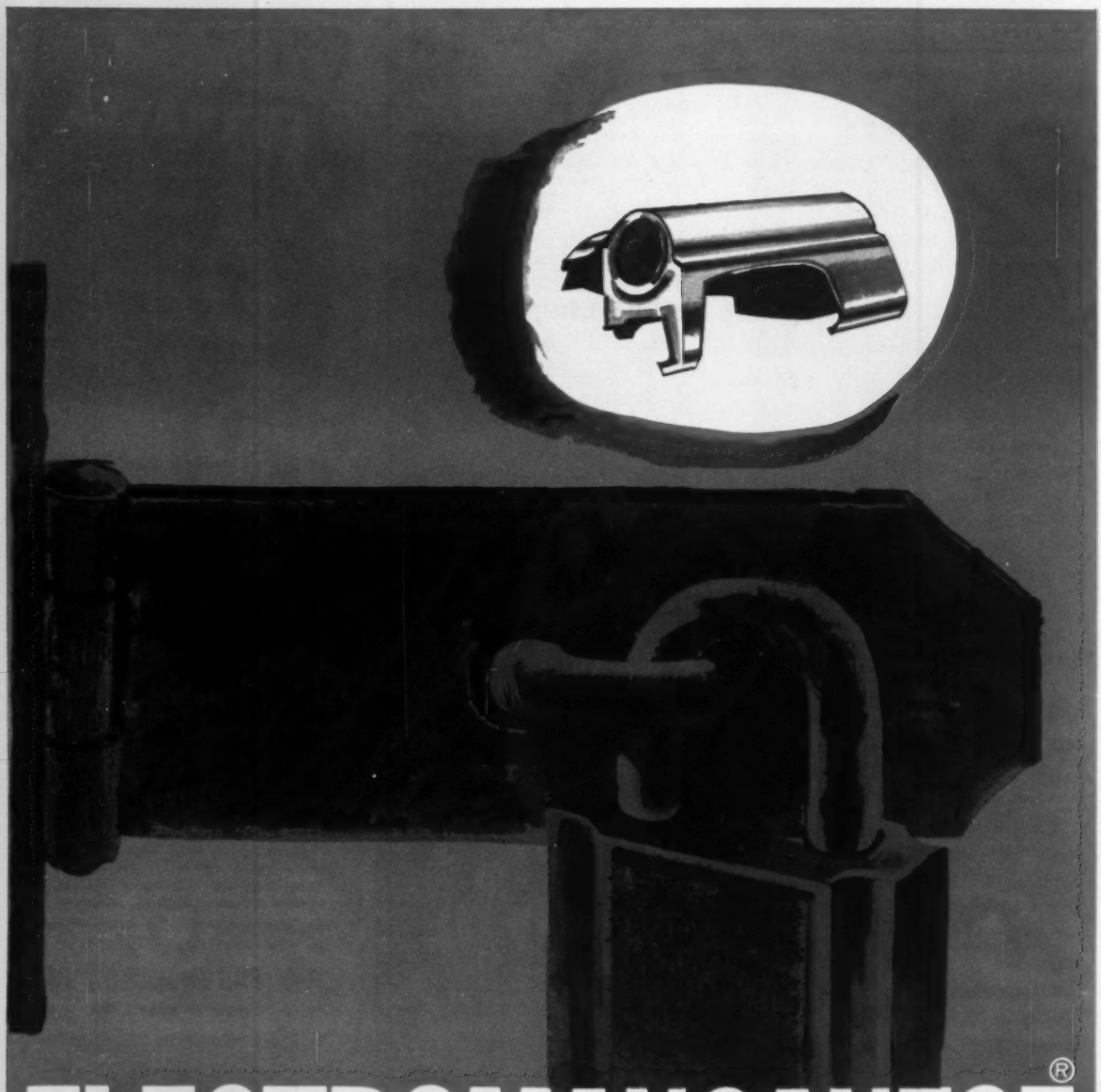
R-S CAR HEARTH FURNACES have proved themselves throughout the world. In foundries for heat treatment of steel and iron castings. In metal working plants for stress relief of weldments, annealing, normalizing, spherodizing and forging, or to heat for rolling, forming, or forging.

For full details on R-S Car Hearth Furnaces write to...

R-S FURNACE CO., INC.
NORTH WALES, PA.



R-S FURNACES



ELECTROMANGANESE®

KEEPS CARBON AND SILICON OUT

FOOTE MINERAL COMPANY

Carbon, silicon, and other impurities never get to the melt when you use pure manganese—ELECTROMANGANESE. Get facts and prices by writing for Bulletin 201 to Technical Literature Section, Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pa., or Box 479, Knoxville 1, Tennessee.

COMING EXHIBITS

Production Engineering Show — Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17).

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals. Metals Park, Novelty, O.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

JUNE

Alloy Casting Institute — Annual meeting, June 19-21, The Homestead, Hot Springs, Va. Institute headquarters, 1001 Franklin Ave., Garden City, N. Y.

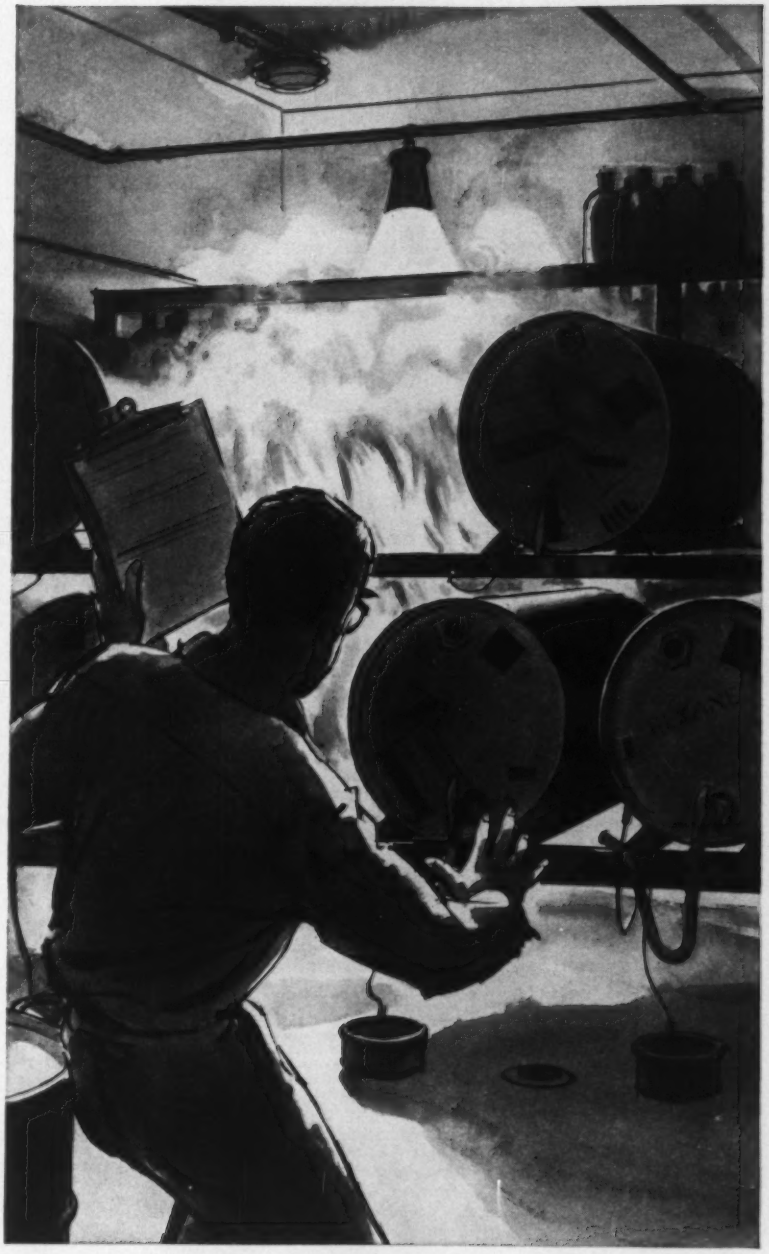
Industrial Safety Equipment Assn., Inc.—Annual meeting, June 21-24, Sedgefield Inn, Greensboro, N. C. Association headquarters, 420 Lexington Ave., New York.

Steel Tank Institute—Semi-annual meeting, June 23-24 Broadmoor, Colorado Springs, Colo. Institute headquarters, 120 S. LaSalle St., Chicago.

Drop Forging Assn.—Annual meeting of members, June 26 - 29, Seigniory Club, Canada. Association headquarters, 1121 Illuminating Bldg., Cleveland.

American Society for Testing Materials—Annual meeting and appara-

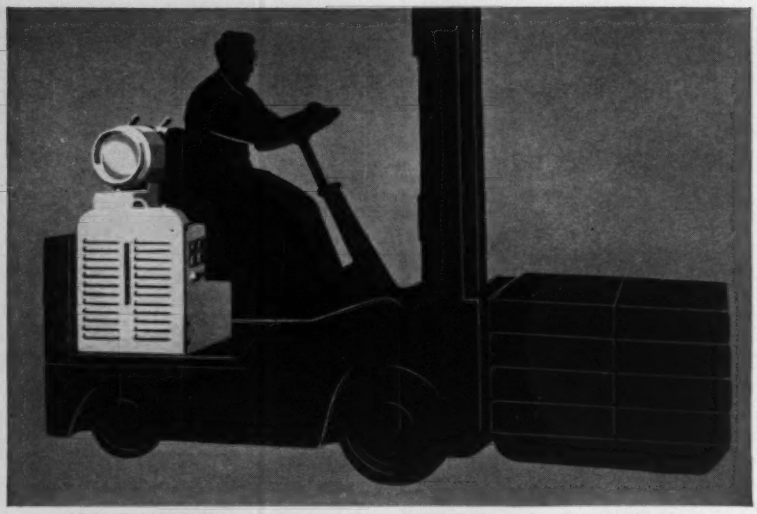
(Continued on P. 16)



Knockout punch! In seconds, fire can have your business on the ropes. Keep your guard up by protecting storage rooms for volatile solvents, gases, flammable liquids with a *fully-automatic* Kidde carbon dioxide extinguishing system. U.L. and F.M.-approved Kidde systems actuate at the first flash of fire, smother it in seconds, leave no mess, turn off power and sound an alarm. Kidde's 35 years' experience can help you protect *any* hazard. Write today and find out how.

Kidde

Industrial and Marine Division
Walter Kidde & Company, Inc.
649 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto — Vancouver



LP-Gas Model HA-3 with recessed housing can be installed on sit-down trucks without seat alteration.

Ready-Power Units Power Trucks At Lowest Cost Per Ton-Mile

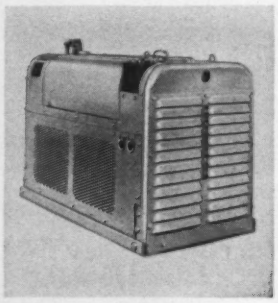
ASSURE FULL-TIME POWER FOR YOUR ELECTRIC TRUCK

It costs you less to move materials when your electric truck is equipped with Ready-Power. The compact Ready-Power Unit consists of a dependable industrial engine and DC generator. It is easily installed or interchanged on practically any make of truck and generates full capacity power whenever needed. There is no power lag, no truck slowdown. Ready-Power also eliminates the constant recharging and replacement of stored power.

Save money and assure full-time power for your materials handling vehicles. Mail the coupon below for complete information on Ready-Power Units.

SERIES HA FOR FORKS UP TO 8,000 LBS., PLATFORMS UP TO 10,000 LBS.

Ready-Power Series HA Units are designed for use with medium size fork, platform and crane trucks. They are available with gasoline or LP-Gas fueling systems, with conventional housing for stand-up trucks or recessed housing for sit-down trucks.



READY-POWER

FREE TECHNICAL BULLETIN 99A

Mail this coupon

The Ready-Power Company
3822 Grand River Avenue
Detroit 8, Michigan

Name_____
Company_____
Address_____
City_____ Zone____ State_____

MEETINGS

(Continued from P. 15)

tus exhibit, June 26-July 1, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters, 1916 Race St., Philadelphia 3, Pa.

JULY

Truck Trailer Mfrs. Assn.—Annual summer meeting, July 10-13, The Homestead, Hot Springs, Va. Association headquarters, 710 Albee Bldg., Washington, D. C.

Cast Iron Pipe Research Assn.—Annual meeting, July 13-14, The Seaview Country Club, Absecon, N. J. Association headquarters, Prudential Plaza, Suite 3440, Chicago.

Metal Lath Mfrs. Assn.—Summer meeting, July 20-21, Carlton House, Pittsburgh. Association headquarters, Engineers Bldg., Cleveland.

American Electroplaters' Society—Annual convention, July 24-28, Statler Hotel, Los Angeles. Society headquarters, 445 Broad St., Newark, N. J.

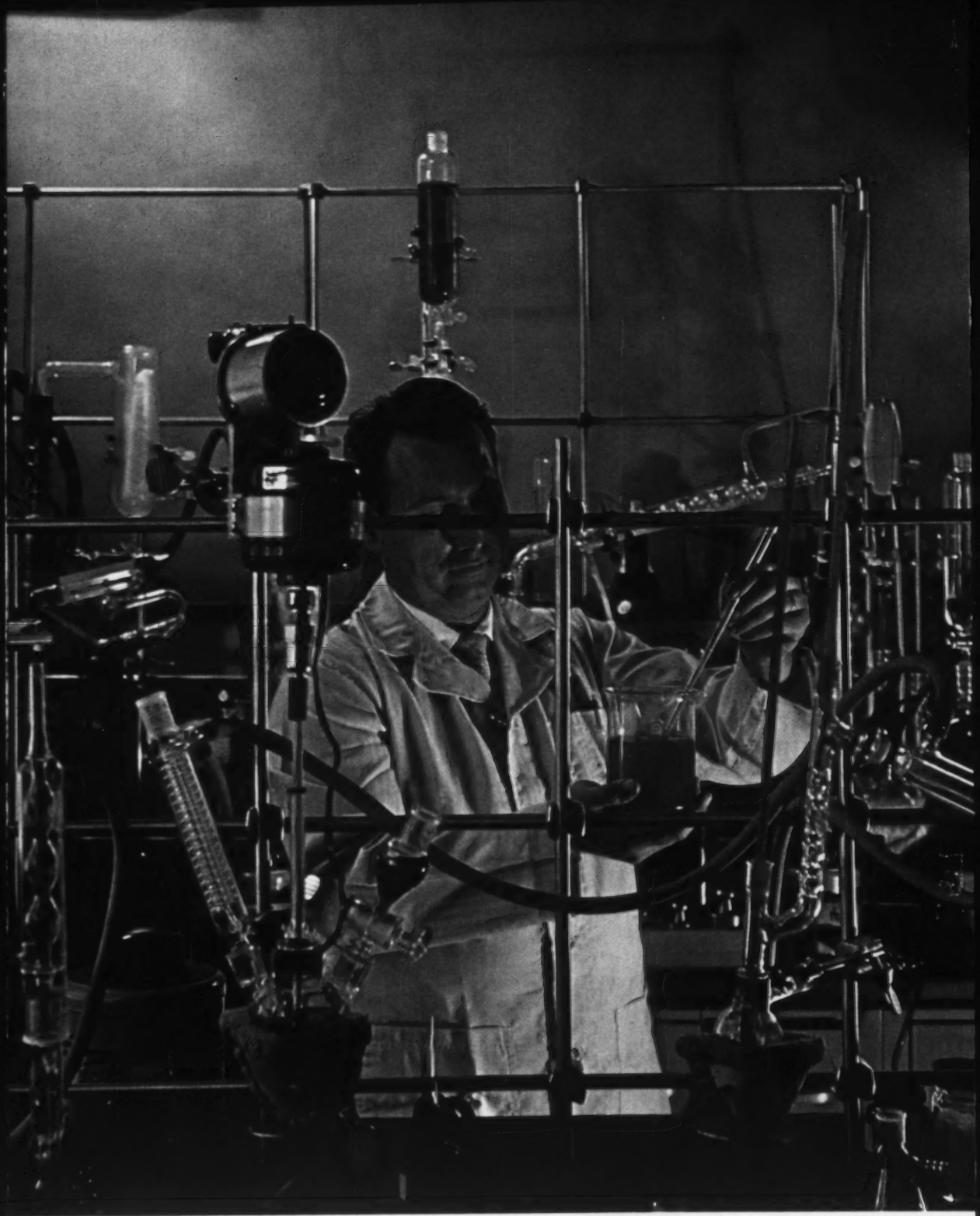
SEPTEMBER

American Machine Tool Distributors Assn.—Annual meeting, Sept. 3-4, LaSalle Hotel, Chicago. Association headquarters, 1500 Massachusetts Ave., N. W., Washington 5, D. C.

Assn. of Lift Truck & Portable Elevator Mfrs.—Fall meeting, Sept. 12, The Cavalier Club, Virginia Beach, Va. Association headquarters, One Gateway Center, Pittsburgh 22, Pa.

Electronic Industries Assn. — Fall conference, Sept. 13-16, French Lick-Sheraton, French Lick, Ind. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

American Die Casting Institute—Annual meeting, Sept. 14-16, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.



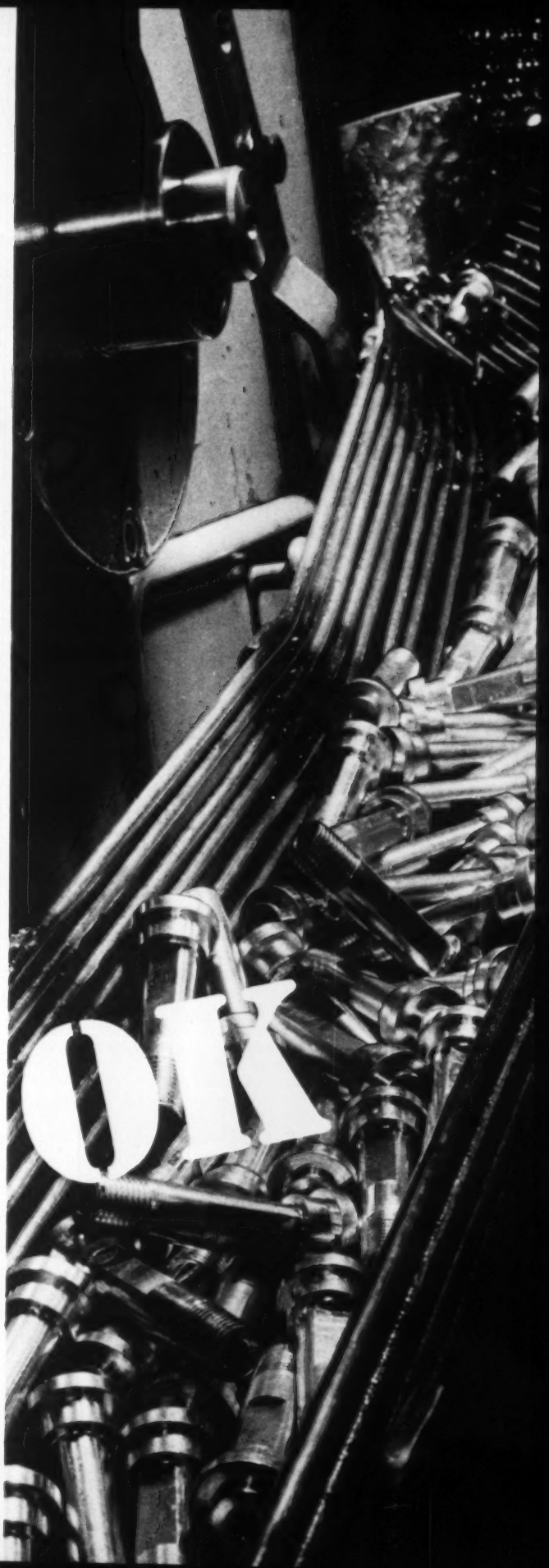
$2H_2 + O_2 \rightarrow 2H_2O$

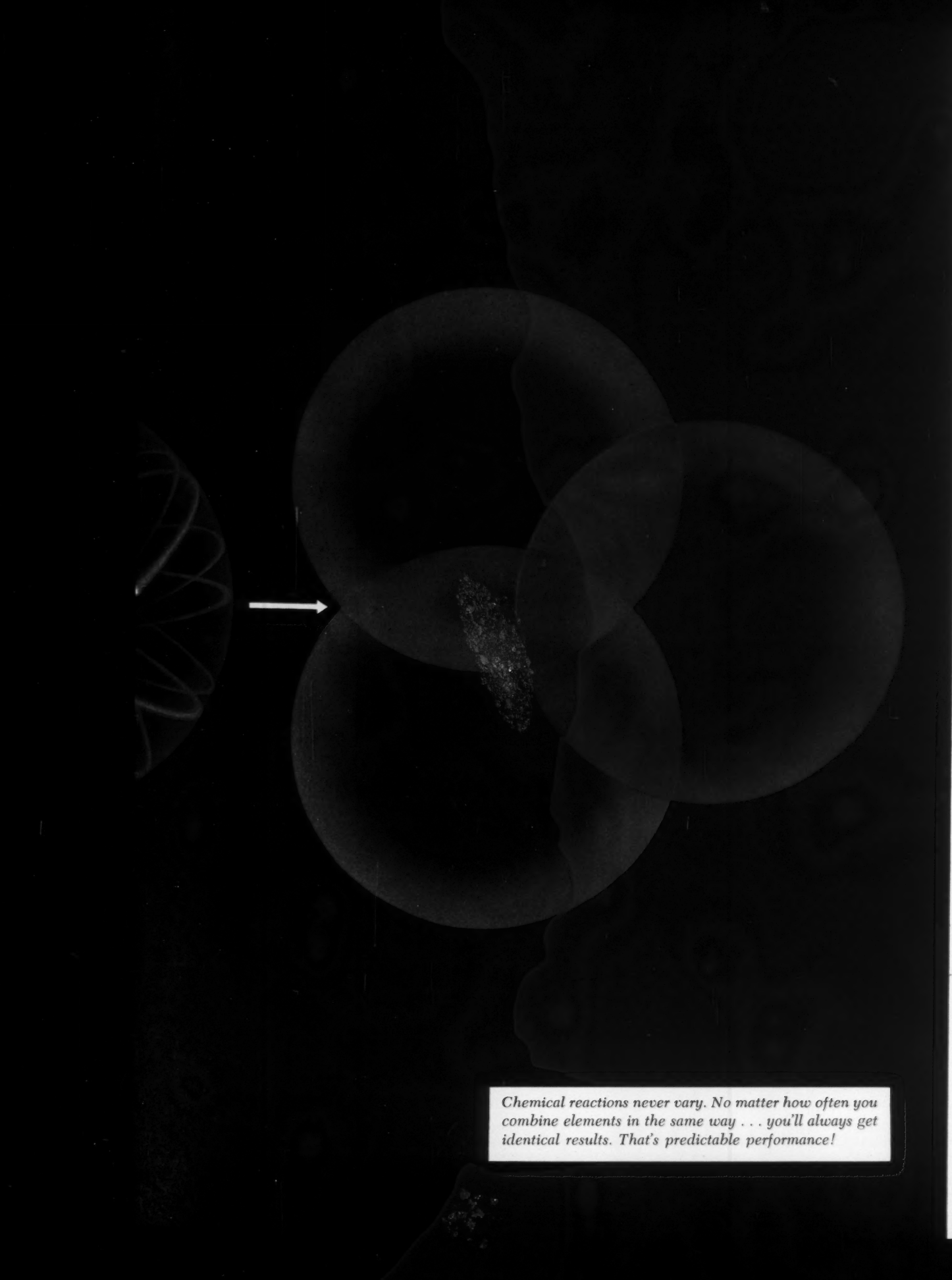
You can always count on this chemical reaction. It's absolutely predictable . . .

. . . don't you wish
you had that much faith
in the uniformity of the

stainless steel bar stock

you use?





Chemical reactions never vary. No matter how often you combine elements in the same way . . . you'll always get identical results. That's predictable performance!

Predictable as a chemical reaction . . .
this new steelmaking process

Carpenter MEL-TROL®

gives you the most consistent performance you've ever had from stainless!

A step beyond quality control! *Carpenter's* exclusive MEL-TROL process includes a *patented* mold which reduces segregation of harmful impurities during solidification of the ingot. This ingot is more uniform . . . freer from segregation. You get clean, sound, tough metal from surface to core area . . . in every bar . . . in every lot.

Predictable performance! Only *Carpenter* stainless steels give you such positive assurance of fast, safe fabrication . . . free and easy machinability you can really count on. And not only will *Carpenter* stainless steels save you time and money in the shop . . . they will also enhance your product reputation in the field. For no matter what combination of properties your product demands in service, you can count on getting them again and again . . . with perfect uniformity. You get predictable performance all the way.

Immediate delivery! Most grades of these MEL-TROL Stainless Steels are ready for off-the-shelf delivery from your nearby *Carpenter* SERVICE-CENTER. And when the need arises, don't overlook other *Carpenter* steels of predictable performance: High Temperature Alloys—Tool and Die Steels—Electronic, Magnetic and Electrical Alloys—Special-Purpose Alloy Steels—Tubing and Pipe—Fine Wire Specialties.

New concepts in service! With the addition of new melting and finishing facilities, our capacity is nearly doubled. Better-than-ever quality . . . more research . . . more technical assistance . . . more local warehouses . . . *Carpenter* is growing bigger and better in all directions. Building upon a long history of pride in craftsmanship . . . backing up our faith in the future with dollars on the line . . . we are combining the best of modern technology and traditionalism. No wonder more and more men in industry, especially customers who know us best, refer to *Carpenter* as . . . *a new company 70 years old.*

Carpenter **steel**

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

local service from coast to coast!

stainless steels! tool and die steels! special-purpose alloy steels!

Check your nearby Carpenter SERVICE-CENTER *first:*

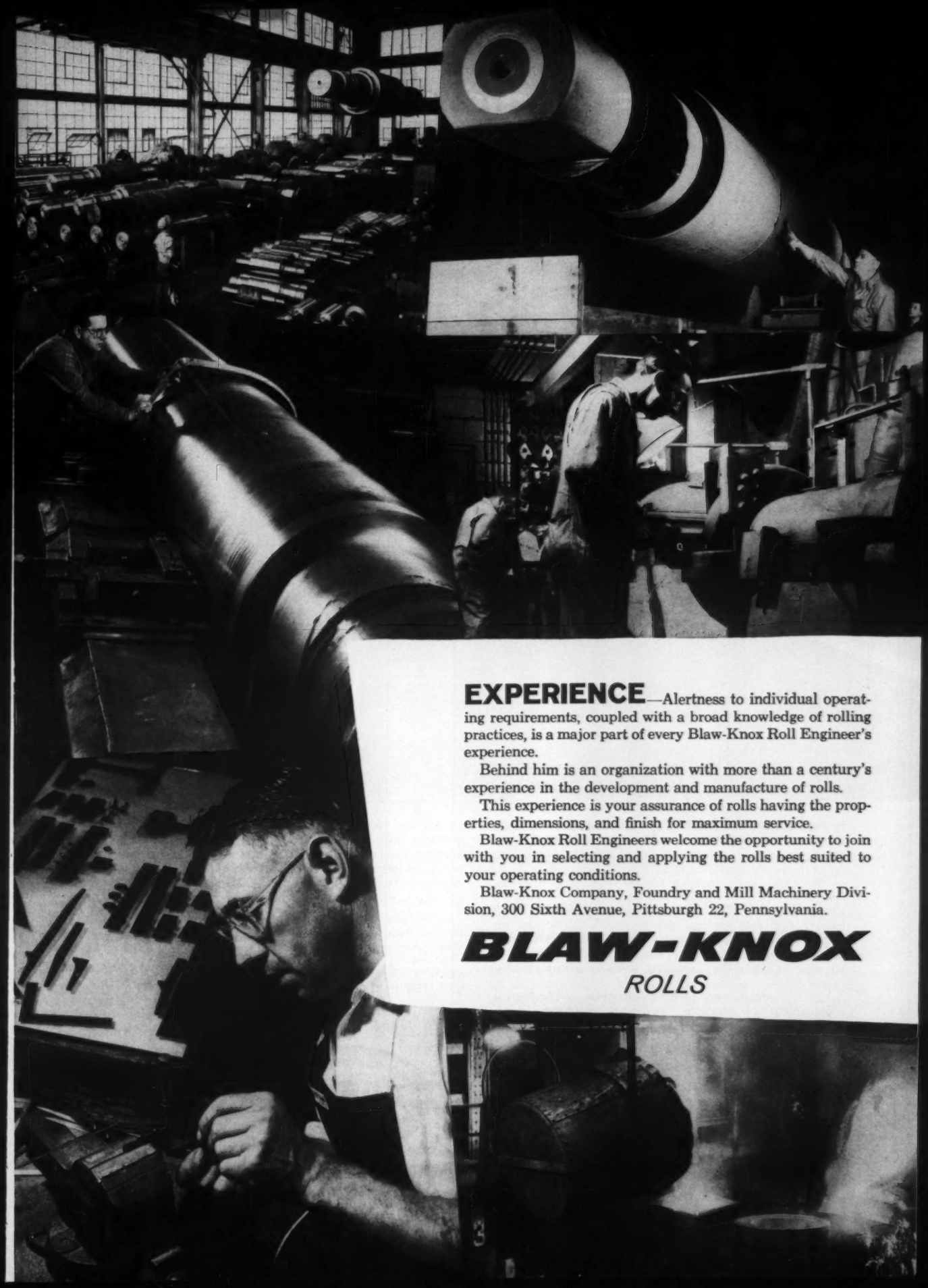
Mill-Branch Warehouses

Atlanta, Ga.
Bridgeport, Conn.
Buffalo, N. Y.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Dayton, Ohio
Detroit, Mich.
Fort Washington, Pa.
Hartford, Conn.
Houston, Texas
Indianapolis, Ind.
Los Angeles, Calif.
Milwaukee, Wis.
Mountainside, N. J.
Providence, R. I.
St. Louis, Mo.
San Francisco, Calif.
Toledo, Ohio
Woodside, L. I., N. Y.

Mill-Branch Offices and Representatives

Beaumont, Texas
Cambridge, Mass.
Des Moines, Iowa
El Cajon, Calif.
Evansville, Ind.
Grand Rapids, Mich.
Hialeah, Florida
Houston, Texas
Jackson, Mich.
Jackson, Miss.
Kansas City, Mo.
Los Angeles, Calif.
Louisville, Ky.
Memphis, Tenn.
Minneapolis, Minn.
Nashville, Tenn.
New Orleans, La.
New York, N. Y.
Pittsburgh, Pa.
Port Arthur, Texas
Portland, Ore.
Phoenix, Arizona
San Francisco, Calif.
Seattle, Wash.
Shreveport, La.
Syracuse, N. Y.
Worcester, Mass.

The Carpenter Steel Company, Reading, Pa.



EXPERIENCE—Alertness to individual operating requirements, coupled with a broad knowledge of rolling practices, is a major part of every Blaw-Knox Roll Engineer's experience.

Behind him is an organization with more than a century's experience in the development and manufacture of rolls.

This experience is your assurance of rolls having the properties, dimensions, and finish for maximum service.

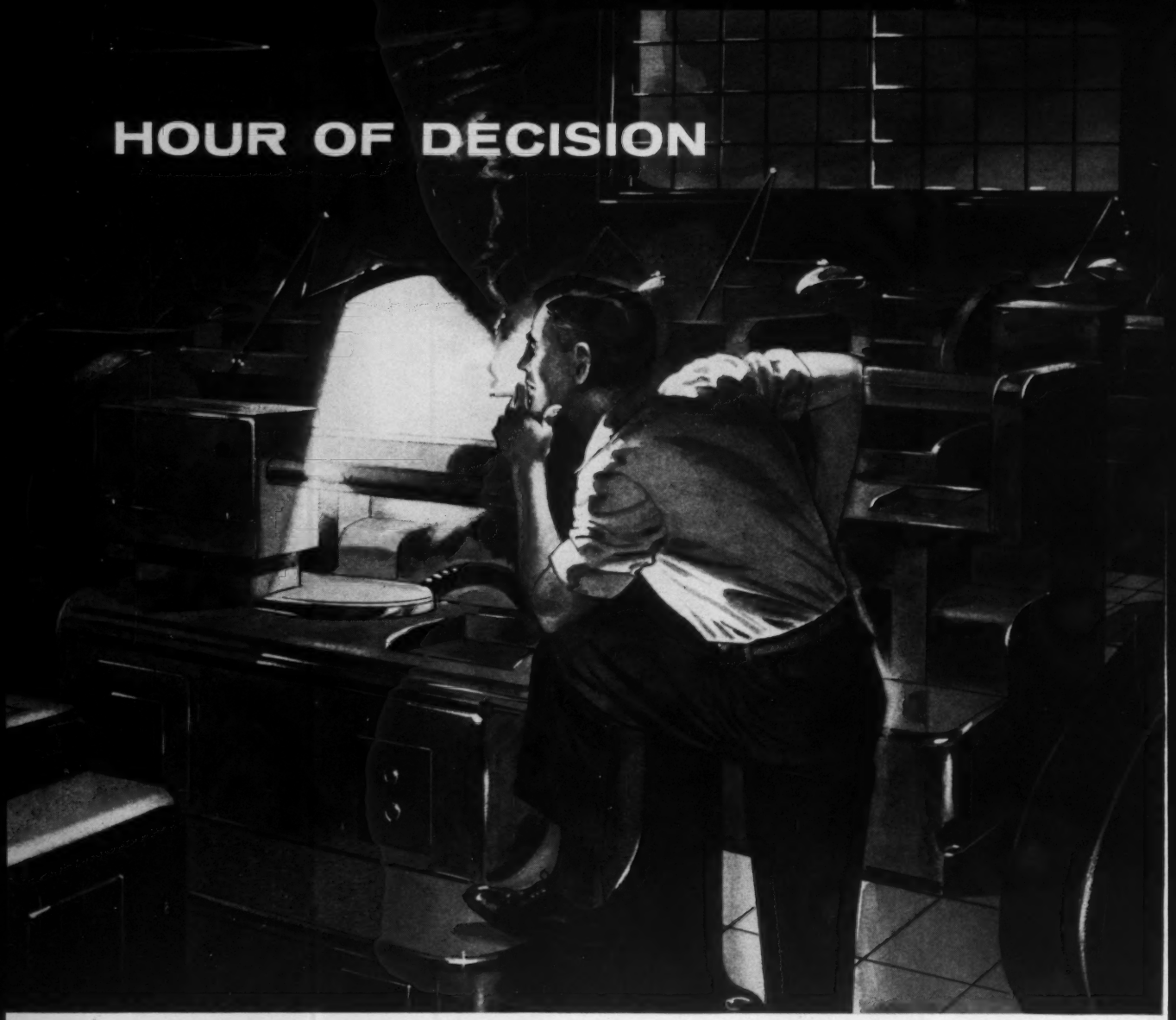
Blaw-Knox Roll Engineers welcome the opportunity to join with you in selecting and applying the rolls best suited to your operating conditions.

Blaw-Knox Company, Foundry and Mill Machinery Division, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

BLAW-KNOX

ROLLS

HOUR OF DECISION



IS THIS YOU? How many times, after the call bell stops clanging, the customers stop phoning, and people stop asking questions, do you walk into the quiet shop to face up to the really vital decisions?

"How can we compensate for the rising costs of materials, overhead, payroll, maintenance?" "How can we keep producing the exacting tolerances, finishes, and quality our markets are demanding?" "How can we improve our production efficiency so that our narrow profit margin will not disappear altogether?" "How can we meet and beat the increasing world-wide competition in our field?"

One proved answer to these questions is the logical replacement of obsolete, inefficient machines. THE MACHINE TOOL EXPOSITION — 1960 will back up this fact with 11 acres of the latest developments in machine tools. Can you afford to miss seeing new, faster machine tools that will produce more efficiently . . . new, better methods that will cut satisfying chunks out of metalworking costs . . . new, ingenious ideas that will help you produce more quality for less cost?

Tool-up for the Sixties. Plan *now* to attend the largest, single-industry exposition ever held in the United States. Have your key personnel on hand, too. It's a once in five years chance to examine the latest technological advancements in automation through numerical controls and see why Modern Machine Tools = Production Efficiency!

Also see the PRODUCTION ENGINEERING SHOW on the Navy Pier. One registration covers both.

FORMULA FOR TOMORROW

MODERN MACHINE TOOLS MMT=PE PRODUCTION EFFICIENCY

International Amphitheatre
Chicago, Illinois
Sept. 6-16

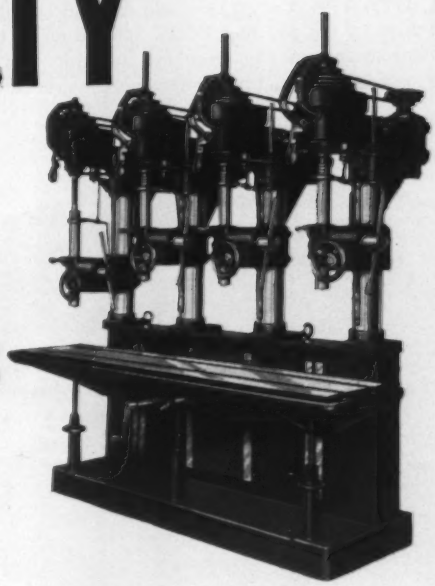
THE MACHINE TOOL EXPOSITION — 1960

For information write to

NATIONAL MACHINE TOOL BUILDERS ASSOCIATION

2139 Wisconsin Avenue, N.W. • Washington, D. C.

RANGE ACCURACY FLEXIBILITY



'BUFFALO' DRILLS HAVE IT

NO. 15 DRILL FOR ALL-AROUND PRODUCTION

This husky ½" capacity machine handles your job drilling or sustained production work with outstanding accuracy, ease and economy. Five speeds, rigidity and precision ball bearing spindle meet most shop requirements for operation at full capacity — while extreme sensitivity assures excellent results in small-hole drilling. Available in 5 models, bench and floor, single and multi-spindle — with tapping, mortising or slow-speed attachments. Write for Bulletin 4024 — or ask your Buffalo Machine Tool dealer about all the operations the No. 15 can do profitably in your shop.

NO. 22 DRILL FOR YOUR HEAVIEST WORK

Here's a powerful, rigidly accurate machine for operations up to capacity of 2" holes in cast iron or 1¼" holes in mild steel — drills to the center of a 22" circle — yet handles as easily as the smallest drill! Available in round column or pedestal types, single or multiple spindle arrangements — sensitive or power feed. 8 speeds, 65 to 1350 RPM, for the most efficient drilling, tapping and spot facing in most capacities. Write for Bulletin 2989 and select the ideal combination of models for your production requirements — or check with your Buffalo Machine Tool dealer.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

See 'Buffalo' Machine Tools in action at Machine Tool Exposition . . . Booth 551

BUFFALO FORGE COMPANY

Buffalo, New York

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

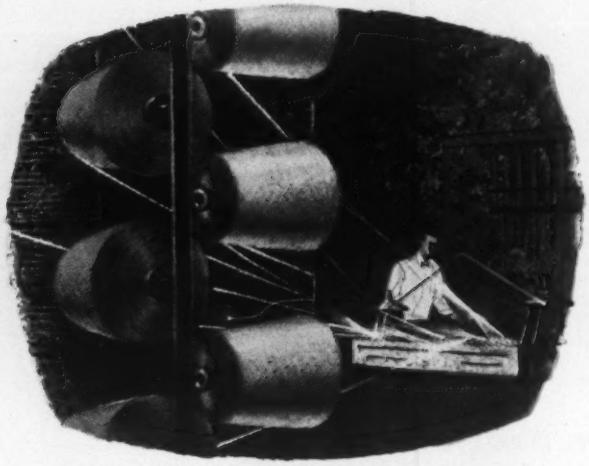
GOODYEAR

EVOLUTION OF

IT ALL STARTED when Leonardo da Vinci invented the belt drive for his polishing wheel. Spurred on by the drive's many advantages, engineers have striven for a more effective method of indirect power transmission ever since.

THE NEXT MAJOR DEVELOPMENT, although then seemingly unrelated, was the discovery of the vulcanization of rubber in 1839. Charles Goodyear not only fathered a multibillion-dollar industry, but also helped pave the way to much more efficient power transmission.

ANOTHER MAJOR BREAKTHROUGH came in 1941, when Goodyear introduced the first practical Steel Cable V-Belt for use on Army tanks. Here was the strongest, most efficient, most heat- and stretch-resistant belt ever built. A wartime success, steel cable is used in belts handling today's toughest industrial drives.

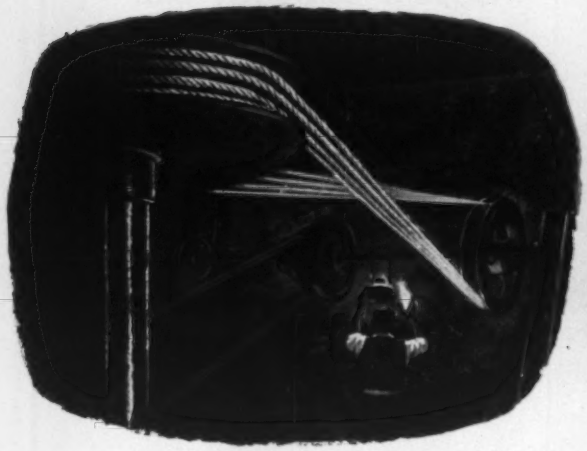


THEN CAME THE "MIRACLE" FIBERS and super-rated V-belts. Again Goodyear was in the fore with the HY-T V-Belt—a strong, shock-resistant belt that answered most multiple drive problems. But V-belt makers still sought a more effective way to overcome stretch and shrinkage.

For maximum, trouble-free horsepower hours on any V-belt drive, insist on the top belt from the top beltmaker.

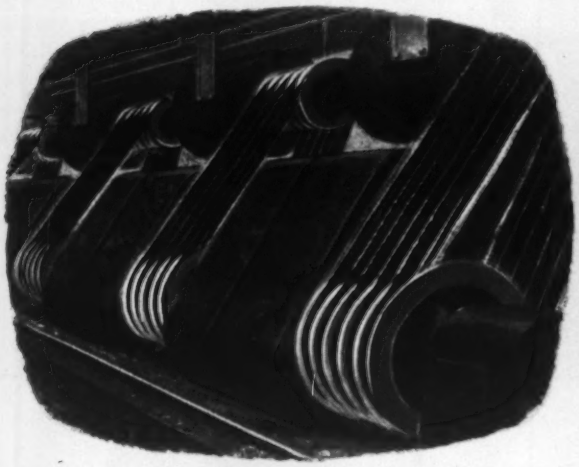
Lots of good things come from GOODYEAR

A REVOLUTION

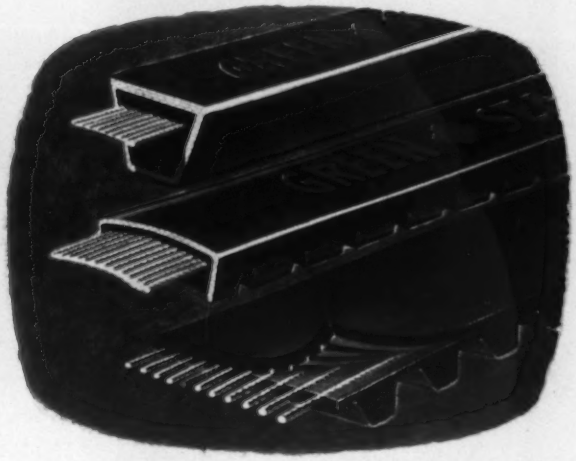


OVER A DECADE PASSED BEFORE a man named Combe introduced two new ideas in the transmission of power—teams of load-carriers and "wedge-in" action. His first multiple rope drive was not very efficient or durable, but started a whole new trend in development.

IT TOOK A LITTLE TIME before the first rubberized V-belts were introduced. Many of the earliest improvements were developed by Goodyear scientists. The greater efficiency of the V-belt soon placed it on many drives, despite shortcomings in length stability and strength.



GOODYEAR SOLVED THE PROBLEM with the 3-T Process to take surplus shrinkage and stretch out of synthetic cord. That development made possible multiple drive V-belts with true dimensional stability—Green Seal V-Belts by Goodyear that stayed matched on the drive or in storage.



A REVOLUTION IN POWER TRANSMISSION was launched by the complete line of V-belts with the Green Seal—Compass-V-Steel, HY-T, E-C Cord, and the compact new HY-T WEDGE. With P. D. (positive drive) and Variable Speed Belts, they combine to offer Goodyear belts of unsurpassed quality for every need.

See your Goodyear Distributor or write: Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

YEAR THE GREATEST NAME IN RUBBER

HY-T, Green Seal, E-C, Compass, P.D.-T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

- FITS PRACTICALLY EVERYONE
- WIDE RANGE OF VISION
- EXCEEDS GOVERNMENT SPECS

Solve protection and fitting problems with the New AO Coverglas Goggle

For the worker who needs impact protection over his regular glasses, this AO Coverglas Goggle (AO 325), does a real job. It fits 99% of workers — (we've tested it widely and know). The 50 mm. round lenses simplify inventories because that's the size which is standard in all other cup goggles used regularly. The frames of black cellulose acetate are better looking than those on previous models. You'll find that the perforated aluminum side shields step up ventilation considerably and they will not corrode. Standard bridge is leather and adjustable. Also available with rigid bar bridge as 325B and with adjustable rigid bridge as 325R. For welders model of this goggle ask for No. 329.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION
Southbridge, Massachusetts
Safety Service Centers in Principal Cities

Welcome Your Plant Visitors Thoughtfully with NEW VISITATION Safety Glasses!

Eye accidents to plant visitors can be costly — and embarrassing. This new face formed spectacle (F790) for temporary and light exposures offers visitors comfortable, lightweight, optically correct eye protection. And the cost is very low — this is the thriftiest priced goggle in the entire American Optical line. Fits over personal glasses. Lens is .020″ thick acetate — clear or green. Temples are clear crystal spatula types. Hand your visitors the F790 in the scratch-free cellophane envelope. It's good public relations — and good business!

NOTE: Packaged in bulk in any quantity.

Always insist on Ⓐ Trademarked Safety Products

Your Surest Protection...AO SURE-GUARD Products

NēBEL HEAVY DUTY LATHES

entirely new...
proven design...

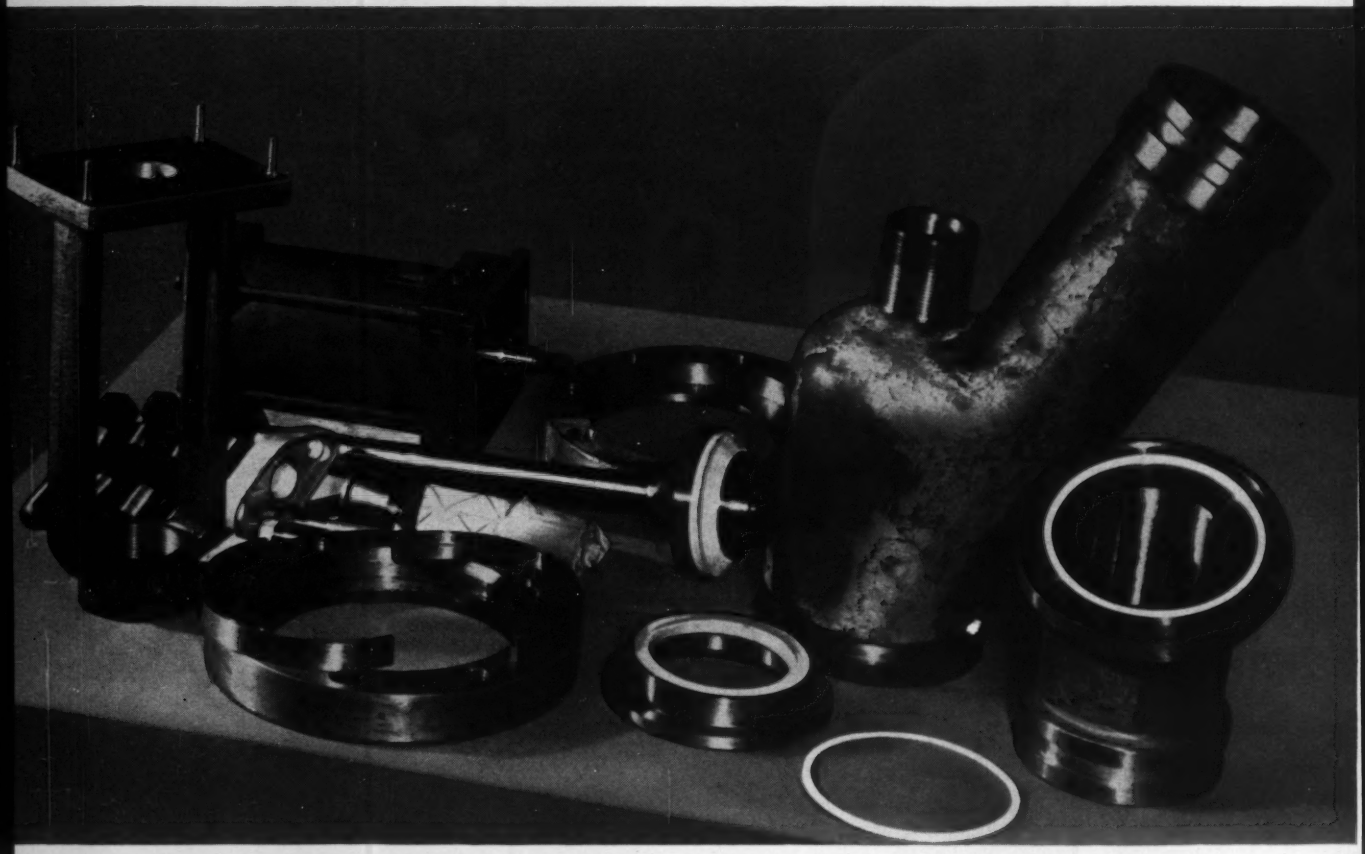
Here are just a few of the many proven design features that help extend Nebel economies even further in the heavy duty field. *Write for new, fully descriptive bulletins:*

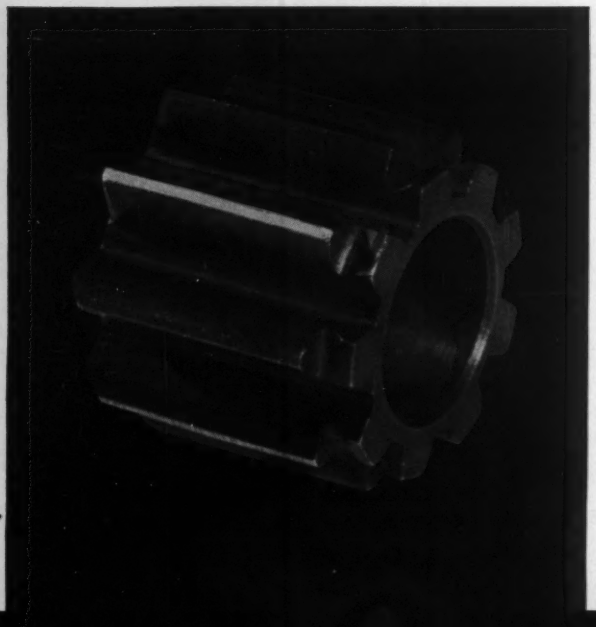
- Heavy Duty Extension Bed Gap Lathe Model HXB 26/45 (Bulletin 211)
- Heavy Duty Model 2013 (Bulletin 212)
- Heavy Duty Model 2516 (Bulletin 213)
- Standard Duty Model 2516-20 (Bulletin 214)

MMT-PE

NEBEL LATHE DIVISION • NEBEL MACHINE TOOL CORPORATION • 3415 CENTRAL PARKWAY • CINCINNATI 25, OHIO • *Lathe builders since 1899*

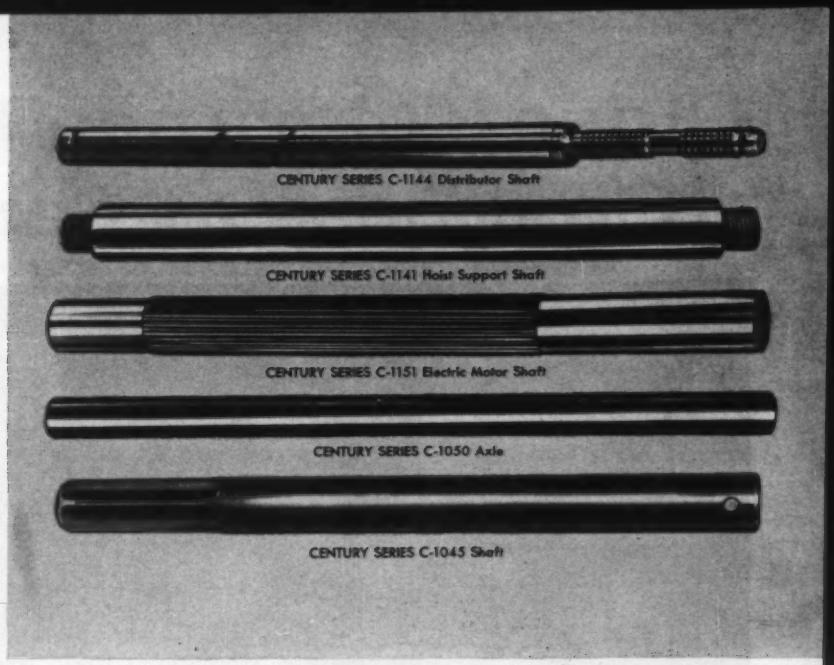
MACHINING HIGH-STRENGTH METALS





TITANIUM WAS CUT, GROUND, TAPPED, spot welded, heat treated, and hand forged by the Crane Co., Chicago, Illinois. Parts produced were valve components—lower stems, disc stem rings, and disc and stem ring pins—used in Freeport Nickel Company's new $119,000,000 nickel-cobalt processing facilities. Crane reports that Republic Titanium permitted close-tolerance machining with considerably fewer rejects than anticipated.

ALLOY STARTER DRIVE PINIONS ARE MACHINED by Eclipse Machine Division, Bendix Aviation Corporation, Elmira, New York. Subject to extreme torque, impact, and wear, these pinions are produced from Republic Type 8716 Cold Drawn Alloy Steel. Bars are blanked, hobbed, chamfered, and drilled. Teeth are cut on a gear hobber and pointed for easy meshing with the flywheel. Send for details on Republic Cold Drawn Alloy Steel.


CENTURY SERIES C-1144 Distributor Shaft
CENTURY SERIES C-1141 Hoist Support Shaft
CENTURY SERIES C-1151 Electric Motor Shaft
CENTURY SERIES C-1050 Axle
CENTURY SERIES C-1045 Shaft

FIVE DEGREES OF MACHINABILITY are offered by Republic's CENTURY SERIES of cold finished, stress-relieved, carbon steel bars. Of five grades—C-1045, C-1141, C-1144, C-1150, and C-1151—each provides a minimum yield strength of 100,000 psi. Proper selection can result in a more economical combination of strength and machinability. The CENTURY SERIES is characterized by dimensional stability with high physical properties over a range of chemistries. Return coupon for data.

STAINLESS STEEL IS MACHINED into one-piece Hyseal Valve Stems for new American-Standard single-lever mixing faucets by the National Acme Company, Cleveland, Ohio. Completed in a single setup, 10 operations including a multiple end drilling of six holes on a 15° angle are performed on the Republic Type 303 Stainless in 12 seconds. For information on the more than 40 types of stainless steel available from Republic, mail the coupon.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. IA-9567
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:

- ☐ Cold Drawn Alloy Steel
- ☐ Republic Titanium
- ☐ Metallurgical and Machining Service
- ☐ CENTURY SERIES
- ☐ Stainless Steel

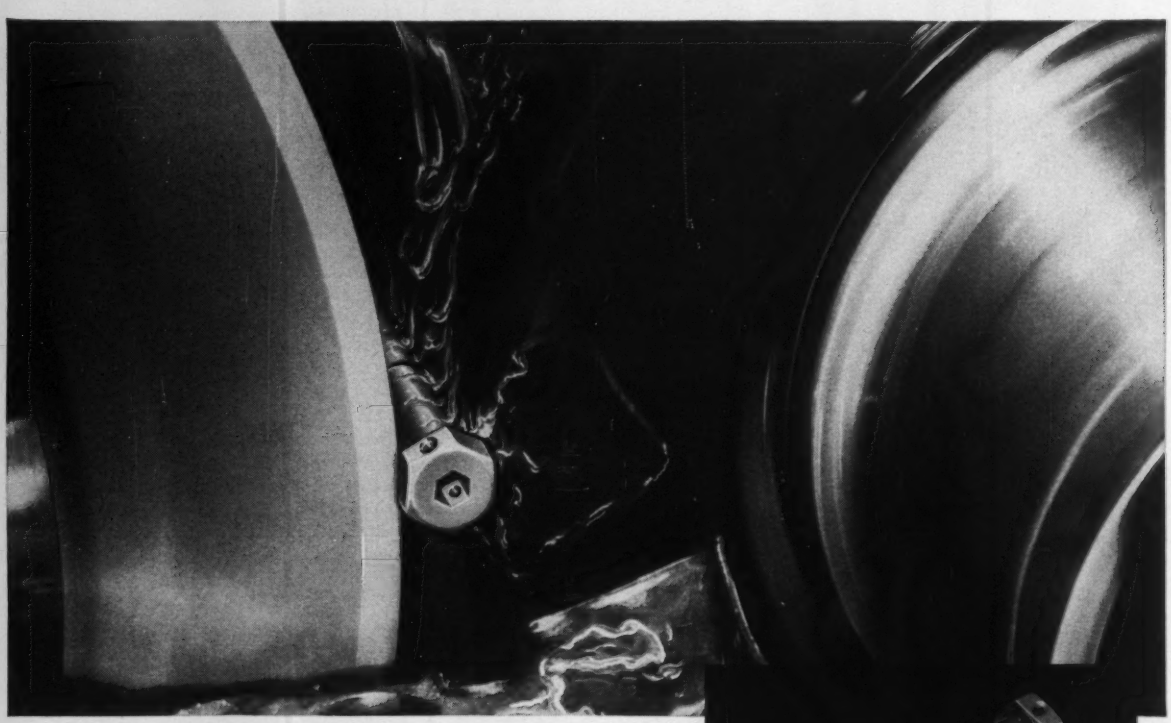
Name_____ Title_____

Company_____

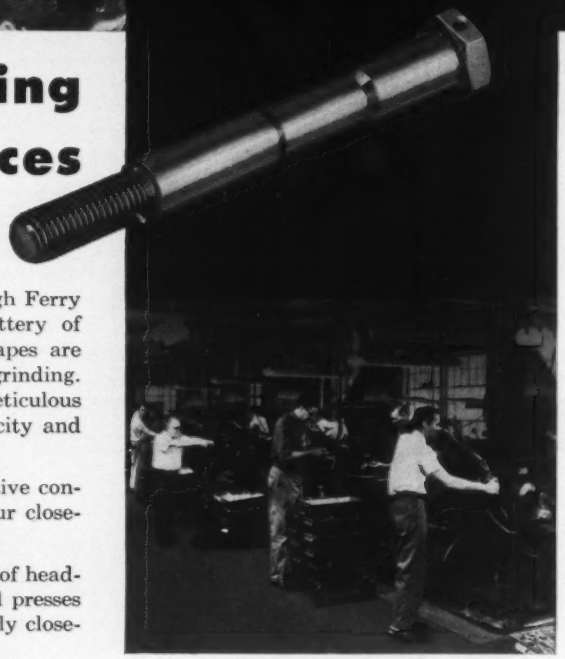
Address_____

City_____ Zone____ State_____

Close-Tolerance Fasteners Cost Less at Ferry Cap!



. . . Centerless grinding guarantees tolerances of .0002"



Precision obtainable in no other way is available through Ferry Cap & Set Screw Company's exceptionally large battery of centerless grinding equipment. The most intricate shapes are exactly and automatically reproduced by contour grinding. Continuous wheel dressing with diamond styli and meticulous checking guarantee tolerances of 0.0002" for concentricity and straightness, with surface finishes that are flawless.

Our years of experience in the production of automotive connecting rod and shackle bolts enable us to produce your close-tolerance fasteners rapidly . . . with savings for you.

In addition, we are equipped with an unusual variety of headers, milling machines, boltmakers and multi-station drill presses that enable us to produce very complex and exceptionally close-tolerance fasteners with unusual economy.

Interested in the possibility of *specials* at near standard prices? Then start saving now with a call to Ferry Cap today!

F-C

Ferry Cap & Set Screw Company
2151 Scranton Road, Cleveland 13, Ohio

KEMP LEAD MELTING POTS *give you 5 exclusive advantages!*

Where speed plus top control counts, you can count on Kemp Immersion Heaters to give you accurate heat control in annealing, tempering, lead and tin melting and many other applications. Here's why:

1 Only Kemp Immersion Heaters are equipped with the exclusive Kemp Carburetor that pre-mixes air and gases. This means lower labor costs . . . more complete control . . . much faster starting.

2 Only Kemp puts the heat where it belongs—next to the material to be melted. Only Kemp uses recirculation heat tubes to transfer heat from the gases to the melt. Overruns and lags are virtually eliminated.

3 Only Kemp eliminates exposed flames, hazards to workers, equipment and plant. Burner is enclosed in heating tube.

4 Only Kemp assures you of no cracked pots at any time. Kemp pots are designed with a safety factor above the level of controlled heat.

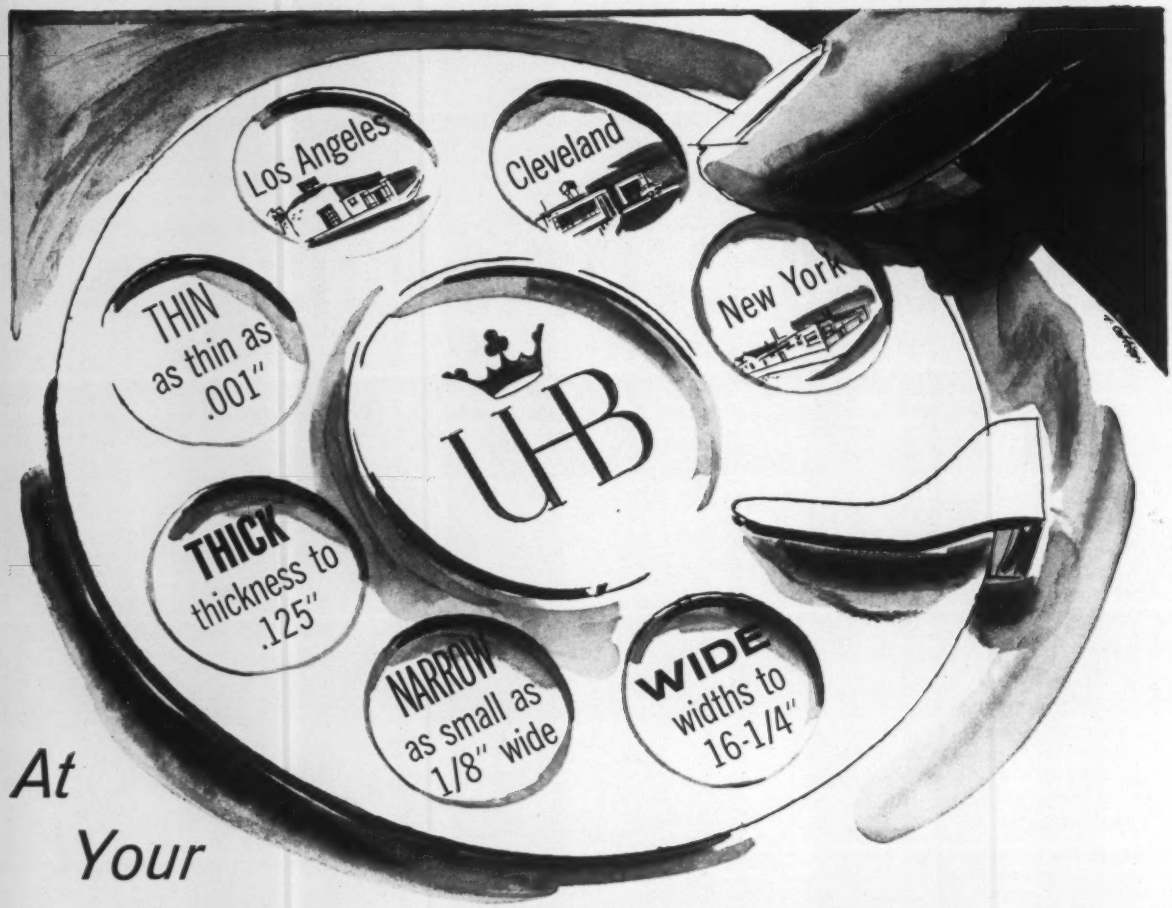
5 Only Kemp gives you accurate temperature control at all times. Set the Kemp unit and forget about it. Kemp's exclusive heater design assures your melt will always, automatically, be uniform.

See the man from Kemp if you're in need of reliable immersion heater equipment. Write today for Bulletin IE-11 or call your local Kemp representative.

It always pays to come to

KEMP
OF BALTIMORE

THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver St., Baltimore 2, Md.



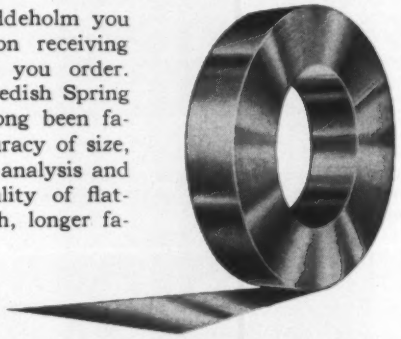
At Your Fingertip . . . UDDEHOLM Spring Steels

STOCK DELIVERY—WIDEST SELECTION—ULTIMATE QUALITY

There are large stocks of almost every grade, analysis and size in every Uddeholm Steel Service Center . . . New York, Cleveland and Los Angeles. You can obtain rapid delivery of tempered, annealed, polished, blue, scaleless or stainless spring steels in widths, thicknesses, lengths and edges to fit your needs exactly. Thicknesses range from .001" to .125", widths from $\frac{1}{8}$" to $16\frac{1}{4}$" with square or rounded edges.

Uddeholm Specialty Steel Service Centers offer a wide range of analyses—straight carbon steels such as SAE 1075 and SAE 1095—Alloy Spring Steels with nickel, chromium, etc., and Stainless Spring Steels for special applications.

And, with Uddeholm you can depend on receiving exactly what you order. Uddeholm Swedish Spring Steels have long been famous for accuracy of size, uniformity of analysis and hardness, quality of flatness and finish, longer fatigue life.



For more information, write for your free 50 page catalog-stocklist TODAY!

UB

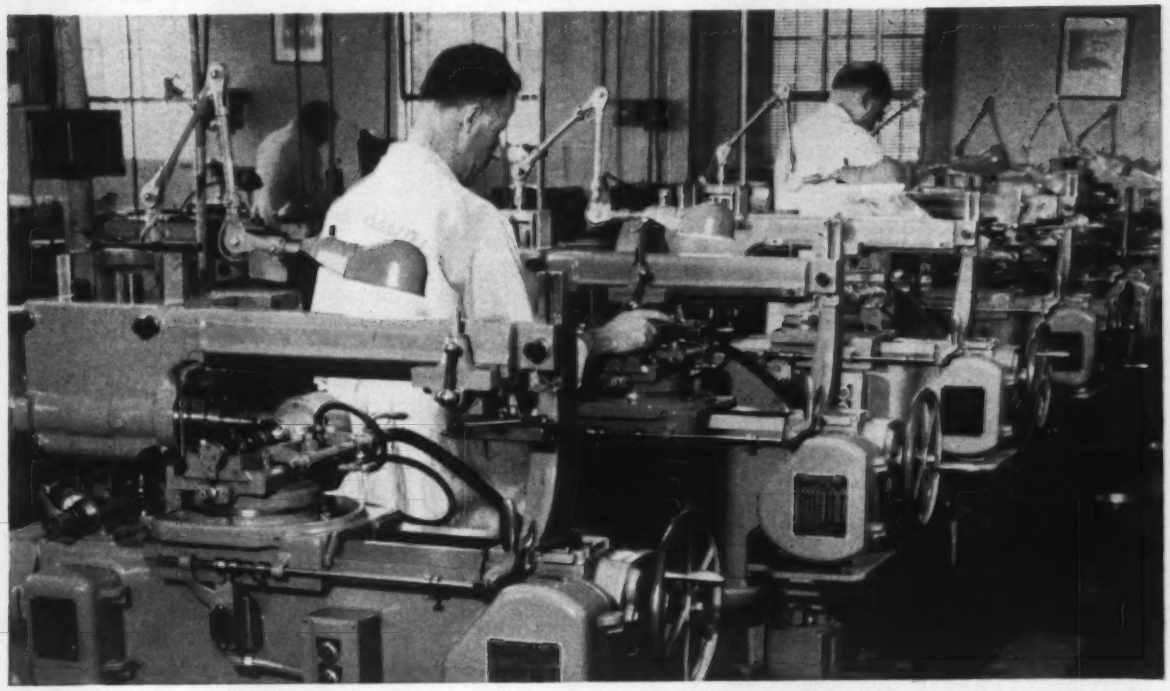
TOOL AND DIE STEELS
COLD ROLLED SPRING STEELS

UDDEHOLM COMPANY OF AMERICA, INC.

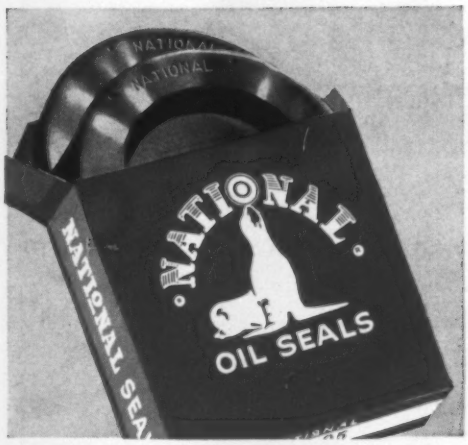
155 East 44th Street, New York 17, N. Y. • MUrray Hill 7-4575

BRANCH OFFICES & WAREHOUSES: Long Island City, N.Y.: 22-14 37th Ave., MUrray Hill 7-4575 **Cleveland:** 4540 East 71 Street, Diamond 1-1110
Los Angeles: 5037 Telegraph Road, ANgelus 2-5121 **Newington, Conn.:** 2175 Berlin Tpke., P.O. Box 136, MOhawk 6-5461
DISTRICT REPRESENTATIVES: Chicago: Frank J. Mackin, Leroy E. Marshall, 55 East Washington, STate 2-1649
Detroit: Warren H. Nugent, 17304 Lahser Road, KEnwood 5-6340 **Philadelphia:** Frank T. Campagna, 1418 Walnut St., PEnnypacker 5-2114
TOOL STEEL WAREHOUSE DISTRIBUTORS: Rockford, Ill.: Rockford Industrial Steel Service, 2229 Twenty-Third Ave. WOodland 3-5463

Better products, *faster,* from your National Seal distributor:



Don't take bearing protection for granted... install new National Oil Seals regularly!



Scheduled replacements with these low-cost seals can pay big dividends in low maintenance costs

Most shops have discovered the money-saving advantages in replacing old oil seals with new National Seals at regularly scheduled intervals to protect precision machines. National Seals hold in lubrication. They seal out abrasive grit and corrosive elements which damage bearings. *Micro-Torc* leather and *Syntech* synthetic, National exclusives, offer unlimited protection for all applications.

Your National Seal Distributor will gladly work with your organization in setting up a compact working stock. Call him for particulars.

NATIONAL OIL SEALS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

NATIONAL OIL SEALS

Your employees' retirement dollars may be your most productive dollars

The dollars you put into a pension or profit sharing plan for your employees are dollars at work for you. Satisfied employees, assured of a secure future, are an asset to any business.

Morale is improved; older employees can be retired; younger employees promoted; good workers attracted; turnover reduced. But, in addition to providing definite retirement benefits for employees, an Ætna Life Pension or Profit Sharing Trust benefits management — and tax advantages are realized by both employer and employee.

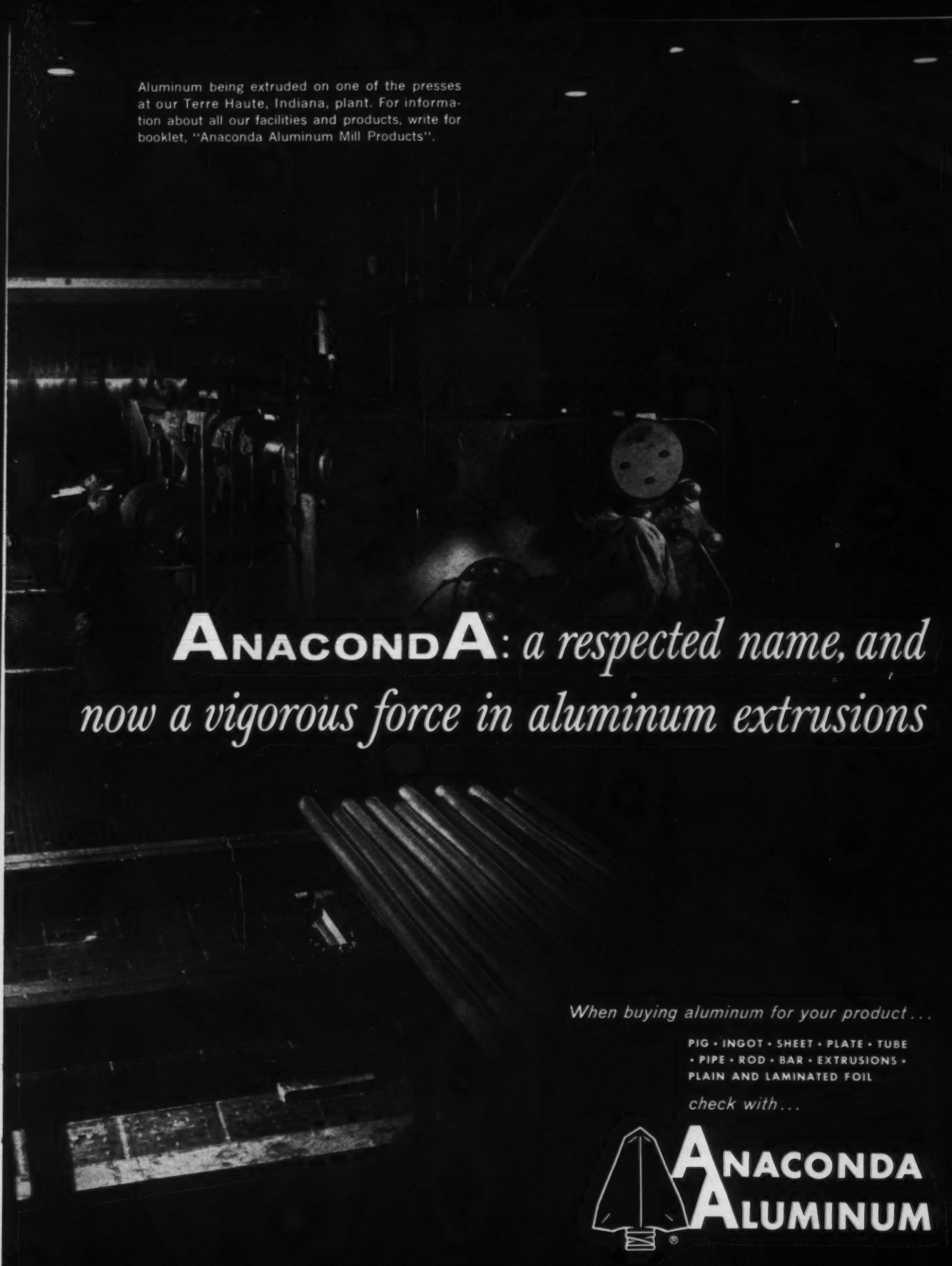
As a leader in the field, Ætna Life will tailor-make a retirement plan to fit your company's individual requirements. Advice of our experienced experts is available without charge or obligation through your Ætna Life office.

Ætna Life Pension and Profit Sharing Plans work for you!

- Improve morale
- Provide for orderly retirement
- Give basis for promotions
- Reduce turnover
- Strengthen public relations
- Offer tax advantages

ÆTNA LIFE
INSURANCE COMPANY
Hartford 15, Connecticut

Affiliates: Ætna Casualty and Surety Company
Standard Fire Insurance Company



Aluminum being extruded on one of the presses at our Terre Haute, Indiana, plant. For information about all our facilities and products, write for booklet, "Anaconda Aluminum Mill Products".

ANACONDA®: *a respected name, and now a vigorous force in aluminum extrusions*

When buying aluminum for your product...

PIG • INGOT • SHEET • PLATE • TUBE • PIPE • ROD • BAR • EXTRUSIONS • PLAIN AND LAMINATED FOIL

check with...

ANACONDA ALUMINUM®

ANACONDA ALUMINUM COMPANY • GENERAL OFFICES, LOUISVILLE 1, KENTUCKY

In silicon, too,

there are bargains–and bargains! The silicon product you buy on the basis of price alone may turn out to be the most expensive in the long run.

The only *real* bargain in silicon, in fact, is when you get the silicon product that is suited to the job you're doing. Since VCA offers a complete line of quality silicon products, your VCA Representative can recommend impartially the silicon that's just right for your application—from the standpoints of both efficiency and economy. Never accept less than the best silicon for the job...that's the only way to get the best buy. Call your nearest VCA District Office for facts and figures. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. · Chicago · Cleveland · Detroit · Pittsburgh

Stainless Steel

VANADIUM
CORPORATION OF AMERICA
Producers of alloys, metals and chemicals

VANCORAM

Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...

Raw Materials?

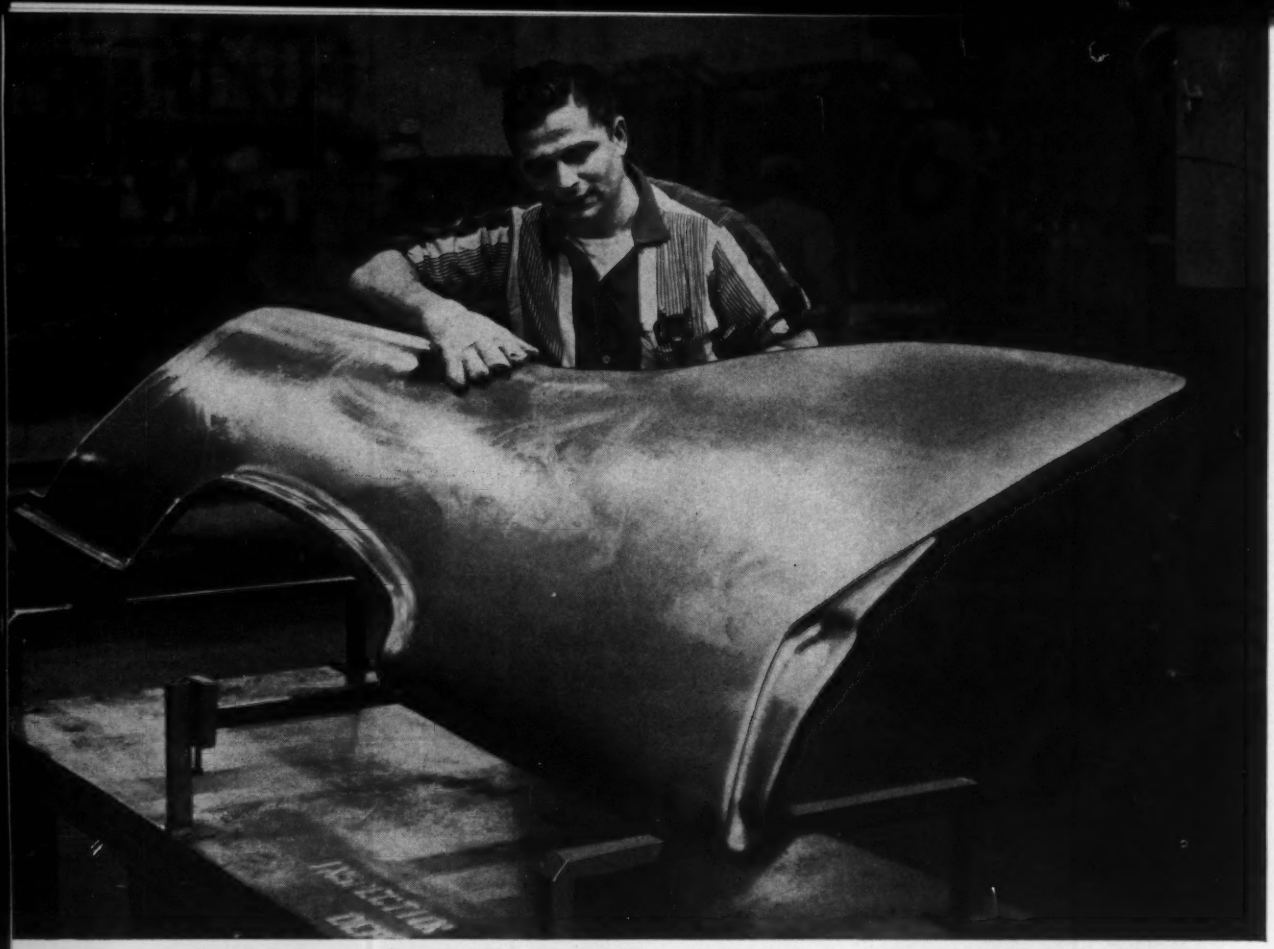
Your final decision to expand or build results from a series of important individual decisions. Raw material availability is one of them. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. In addition, KE designs and builds for the Steel industry... offers skilled experience in all types of facilities from raw material plants to finishing mills. Whatever your requirements... from Pre-Engineering analyses through plant design and construction... Kaiser Engineers brings world-wide experience and ingenuity to their solution.

KAISER ENGINEERS

KAISER ENGINEERS engineers - contractors
Contracting since 1914

Oakland 12, Calif. — Chicago, New York, Pittsburgh, Washington, D.C.
Accra, Buenos Aires, Montreal, New Delhi, Rio de Janeiro, Sydney, Vancouver, Zurich

6231-S



One of the largest and most difficult of some 600 stamped parts produced at Chrysler Corp's. Twinsburg (Ohio) Stamping Plant, rear quarter-panel of Plymouth two-door hard-top shows performance results of Pittsburgh Steel's drawing quality sheet under tough forming conditions.

Pittsburgh Steel Sheet Helps Chrysler Corp. Build 'Solid '60' Plymouths

There's more than meets the eye in the distinctive fin styling on the "Solid '60" Plymouth.

First, they're no longer simply fins—they've been given a performance job in Chrysler Corporation's new "unit construction" assembly to help reduce driver steering effort in normal highway travel.

Second, there is another performance story behind the aero-dynamic sweep of Plymouth's rear quarter-panel of which the stabilizer, or fin, is a part. It's the performance of Pittsburgh Steel Company's cold rolled sheet under stress of severe deformation in a complex die-forming operation.

Pittsburgh's drawing quality steel used for this part must, at one time, produce a deep curved draw for the panel's saddle, a shallow draw for the wheel housing and a severe dog-leg draw for the tail light area.

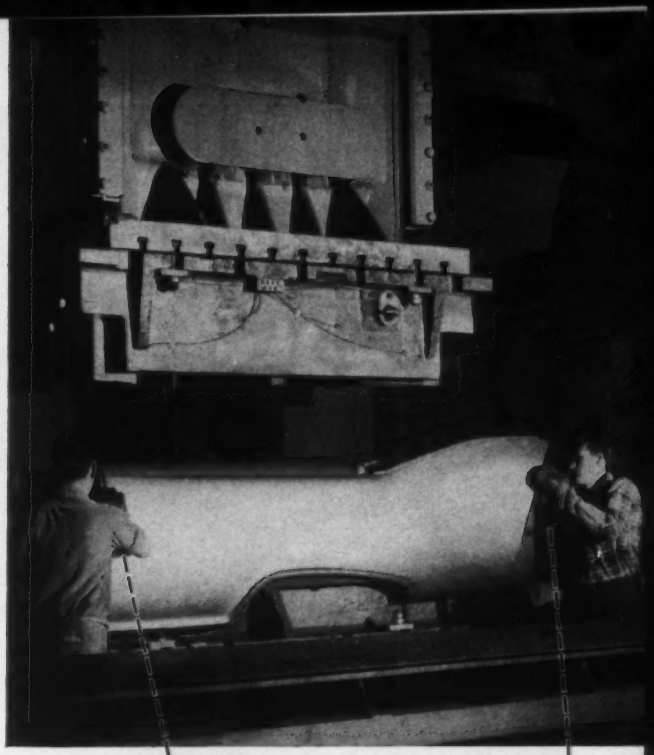
Simultaneously, it must have sufficient ductility to prevent buckling in the drawn areas and uniform flatness to achieve a stiff panel which resists a "pop-pop" oil can effect under pressure. Otherwise, an additional operation would be required.

Finally, the formed panel must emerge without flex marks, strain marks or breaks to provide a mar-free surface ready for finishing.

Pittsburgh Steel each day proves its drawing quality sheet can perform within these rigid requirements at Chrysler's big Twinsburg (Ohio) Stamping Plant where some 600 stamped parts are produced for all Chrysler "big car" models.

Besides being one of the most difficult parts to form, the rear quarter-panel (rear fender) of Plymouth's two-door hardtop is one of the largest stamped parts produced at Twinsburg.

To meet the performance standards established by Chrysler, the steel is precisely



Steel blank measuring 110 by 47 by .041 inches is fed into big toggle press above for die-forming operation that will produce basic shape of rear quarter-panel. The ductility and the flatness of Pittsburgh Steel's cold-rolled sheet are critical here due to severe deformation. Drawing quality sheet, with properties metallurgically matched to forming requirements, produces this sleek panel (right) that provides distinguished rear quarter styling and stabilizing feature for Plymouth's 1960 two-door, hard-top model (below).

The "Solid '60" Plymouth Fury.

controlled from open hearth to temper mill by Pittsburgh Steel's veteran steelmakers. They achieve the chemical composition, ductility, hardness, grain size, flatness and finish required in steel to form the part.

And that's where Pittsburgh Steel's field metallurgists also serve Chrysler — by studying every die-forming operation to determine exact properties required to achieve peak performance in the stamping process, in assembly and ultimately on the road.

The result: steel with metallurgically controlled drawing qualities matched to the part's forming problem.

The performance benefits of Pittsburgh Steel's drawing quality sheet will work for you, too. Metallurgical practices and services developed by nearly 60 years of steelmaking experience enable Pittsburgh Steel to produce flat rolled with the precise properties your operation requires.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

MCA FLUX
AND RIMMING STEEL

Very revealing tests may be made for uniformity of analysis of rimming steels, by comparing top to bottom, rim and core, edge to center, between MCA flux treated and non-treated ingots. Elements most readily segregated—sulphur, carbon, phosphorous and nitrogen—are held in remarkably close limits through the economical use of rare earths.

This allows the use of even larger ingots, with its attendant production economies. For example, rare earth additions to larger rimming ingots of 50,000—60,000—70,000 pounds afford a quality and uniformity formerly obtained only in smaller ingots.

Alert engineers and metallurgists are now studying large rimming ingot products made possible by using our MCA flux. MCA, the leading rare earth producer and processor, has valuable technical information on this subject, and will be happy to share it with you. Write today for specific information.

MOLYBDENUM CORPORATION OF AMERICA

2 Gateway Center **Pittsburgh 22, Pa.**

Offices: Pittsburgh, Chicago, Los Angeles, New York, San Francisco
Sales Representatives: Brumley-Donaldson Co., Los Angeles, San Francisco
Subsidiary: Cleveland-Tungsten, Inc., Cleveland
Plants: Washington, Pa., York, Pa.

MCA

HOW HEAVY A LOAD

can a ball bearing carry?

Federal Ball Bearings make light work of the heaviest loads. *Quiet* work, too. We use SAE 52100 steel and engineer extra stamina into every ball and raceway. Each bearing goes through scores of production and quality control steps because, frankly, we're terrible cranks about precision. We insist that you should be able to mount a ball bearing—and forget it.

Our customers seem to like this idea. And they include the most respected names in American industry. So, when you want to take a work load off your shoulders, put it on a Federal Ball Bearing. Our catalog lists over 12,000 ball bearing sizes, hundreds of types. Send for it.

THE FEDERAL BEARINGS CO., INC., Poughkeepsie, N. Y.

Federal
BALL BEARINGS

One of America's largest ball bearing manufacturers

FEDERAL ON FILM—A 16 mm. color sound film takes you through our 400,000 sq. ft. plant. Loaned free. Just ask for it.

ANNOUNCING A NEW CORPORATE NAME

for The Garlock Packing Company

Garlock Inc. becomes the new name for The Garlock Packing Company, Palmyra, N. Y., to reflect more accurately its broad diversification of products and markets.

Originally established to manufacture mechanical packings, Garlock now produces over 2,000 different styles of packings, gaskets, seals, molded and extruded rubber and plastic products for every major industry.

The new corporate name, Garlock Inc., more closely identifies this 73-year-old company with the growth and development of its product lines. *Today, industry goes to Garlock for such widely diversified products as:*

- Hydraulic-Pneumatic Packings
- Oil and Grease Seals
- Gasketing and Expansion Joints
- Braided Packings
- Molded and Extruded Rubber Parts
- Plastic Stock Shapes and Fabricated Parts
- Mechanical Seals for Rotating Shafts
- Metal Packings
- Leather Packings
- Electronic Components
- Dry Bearing Materials
- Fluorocarbon Tank Linings
- Missile and Rocket Components

To help you in selecting or applying these products, Garlock offers the services of over 126 thoroughly-trained sales engineers, 175 electronic component manufacturers' representatives, 180 authorized bearing distributors and 69 foreign distributors. Conveniently located warehouses and stocking points assure Garlock customers of prompt delivery.

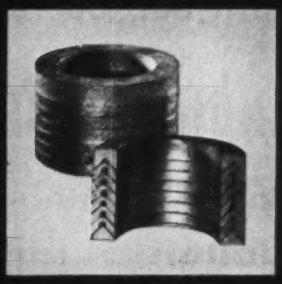
At Garlock Inc., design and development of new or improved products and materials is an ever-present objective. To this end Garlock maintains extensive research and laboratory-test facilities. In addition, Garlock engineers and chemists are always ready to work with you in seeking solutions to tough application problems.

GARLOCK

To find out more about "the new Garlock," call the nearest of our 26 sales offices, or write to Garlock Inc., Palmyra, N. Y. *To assure prompt attention,* please refer to *Garlock Inc.* on all future correspondence and orders.

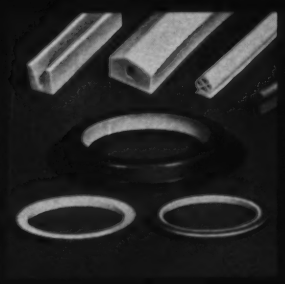
Canadian Div.: Garlock of Canada Ltd.

Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.



Hydraulic-Pneumatic Packings

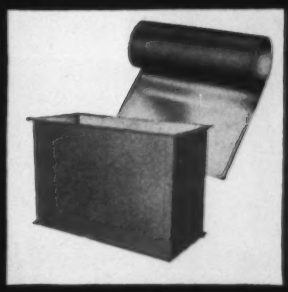
Expansion Joints



Molded and Extruded Rubber Parts

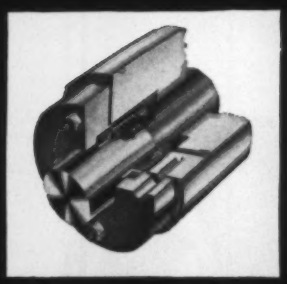
Plastic Stock Shapes
and Fabricated Parts

Braided Packings



Fluorocarbon Tank Linings

Oil and Grease Seals

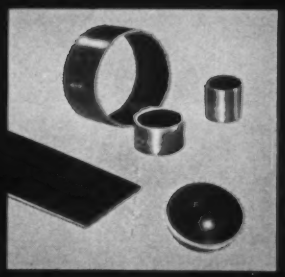


Mechanical Shaft Seals

Gasketing

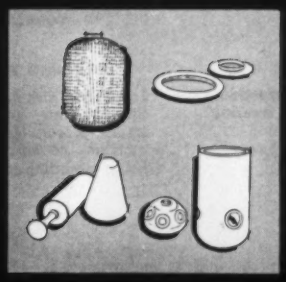
Spiral Wound Gaskets

Metal Packings

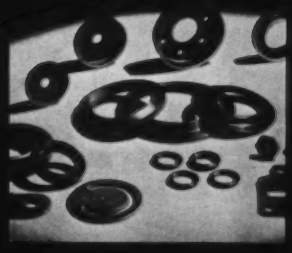


Dry Bearing Material

INC.



Missile and Rocket Components



Leather Packings

Electronic Components

they turn in top performance to turn out top results

SIMONDS CENTERLESS GRINDING WHEELS

top rated for fast, free-cutting . . .
high production . . . long wheel life

"Ground 70,000 pieces compared to 45,000." "Held corners and shape better than wheels previously used." "Entirely satisfactory. Gave excellent finish." These comments from users* are some reasons why Simonds Centerless Wheels are rated superior for job-to-job dependability . . . and good reasons why *your* way to accurate, lower cost centerless grinding may lie in switching to Simonds Wheels. Write for bulletin ESA 55.

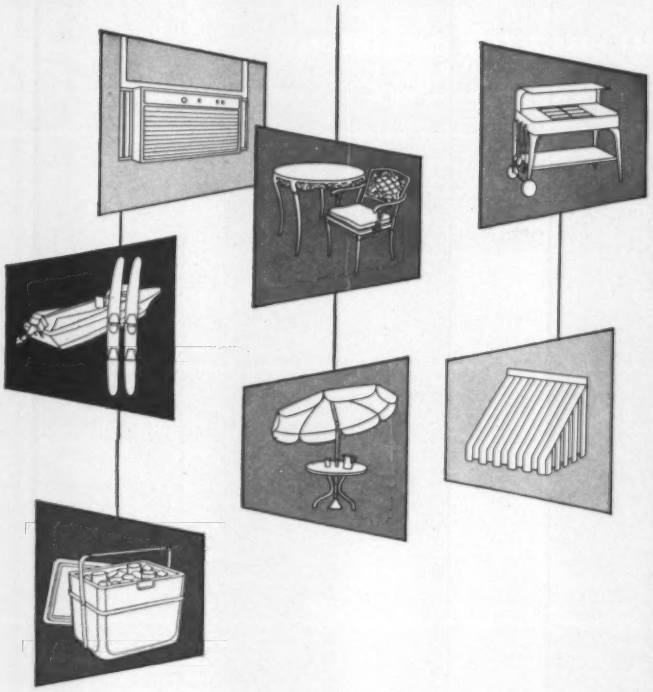
*Names on request.

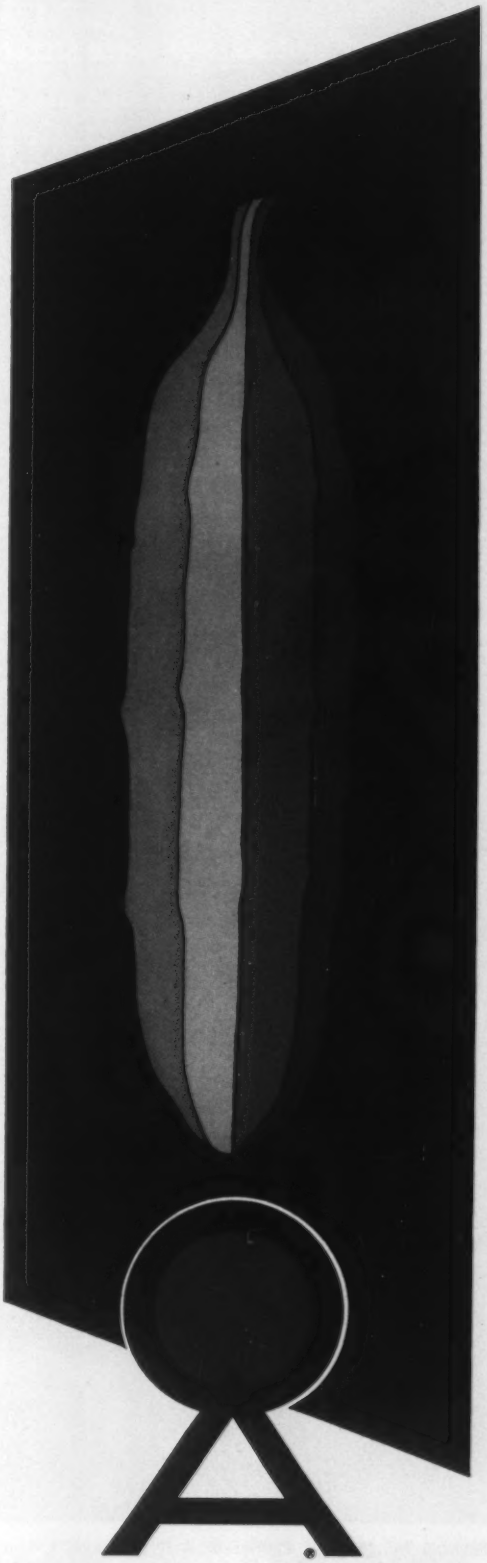
SIMONDS ABRASIVE CO.
PHILADELPHIA 37, PENNA.
Division of Simonds Saw and Steel Co.
COUNT ON / YOUR SIMONDS DISTRIBUTOR FAST SERVICE • LOCAL STOCKS

REGULATING WHEEL
Rubber bonded feed wheels exceptionally long wearing and have good traction . . . perfect mate for the Simonds Grinding Wheel.

GRINDING WHEEL
Job-proved Grain and Grade Specifications for all materials. Karvit bushed non-metallic center hole for better mounting and balance.

WEST COAST PLANT: EL MONTE, CALIF.—BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO SHREVEPORT — IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC





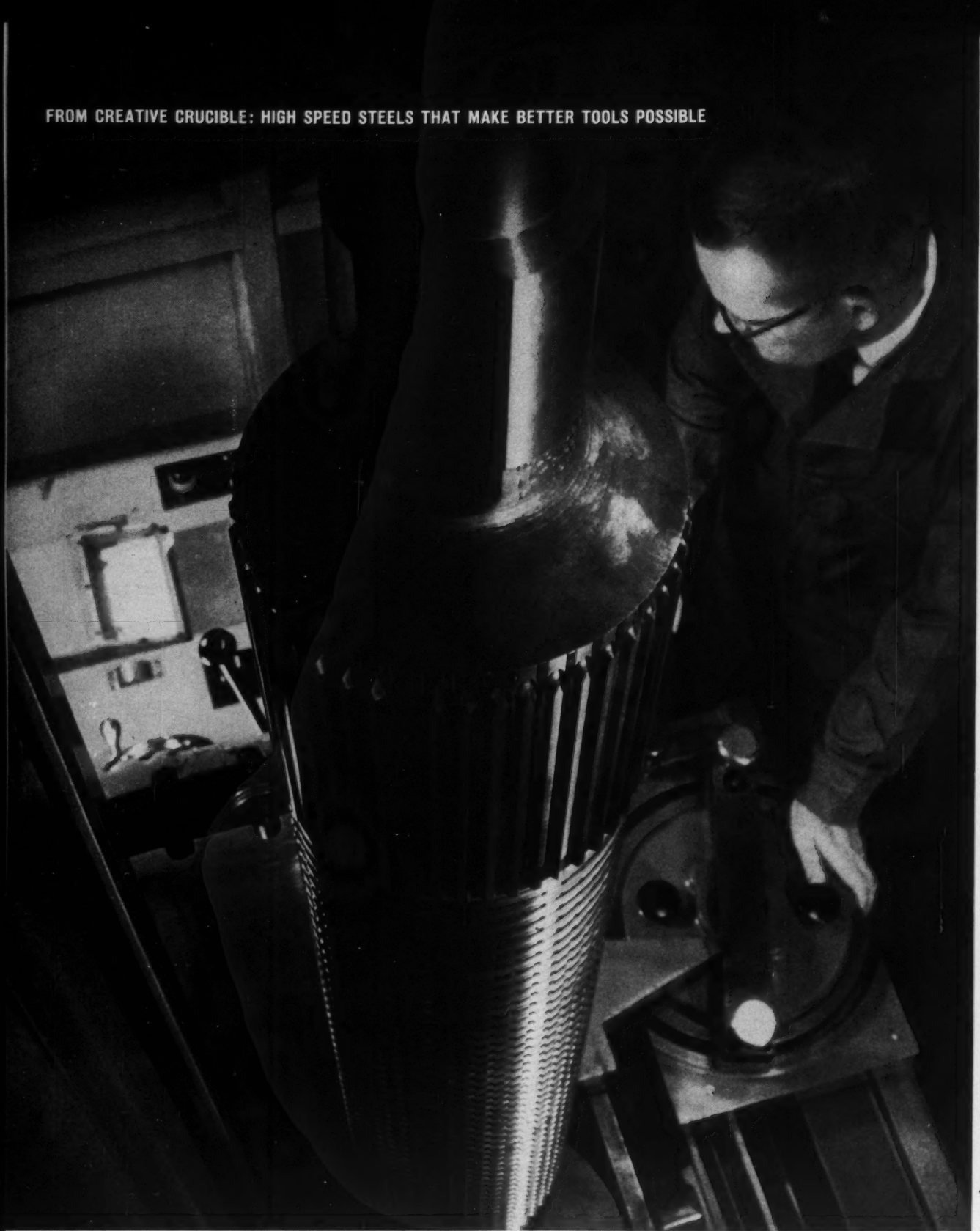
THIS SUMMER
PLAY IT COOL...
WITH
OLIN ALUMINUM

Why get hot and bothered over supply problems? Whenever you need aluminum, take a tip from leading consumer products makers—call Olin Aluminum. Then relax. The alloys, tempers and finishes you need . . . in the forms and quantities you want . . . are as good as in your plant when you need them.

Same holds good for servicing. Need design assistance? Got a tricky die problem? Want the latest word on finishing techniques? Even if it's 110° in the shade, our man will be there in a jiffy. Olin Aluminum. Sheet, extrusions, casting alloys, rod & bar. Sales offices and distributors everywhere.

OLIN MATHIESON · METALS DIVISION · 400 PARK AVENUE · NEW YORK 22, N.Y.

OLIN ALUMINUM



CHECKING THE INVOLUTE PROFILE OF A SPLINE BROACH. Broach's 6" pitch diameter is designed to cut 48 splines—hold accuracy of +.0002"-.000" on all splines for 30". This accuracy is possible on broaches up to 82" when made of Rex High Speed Steel.

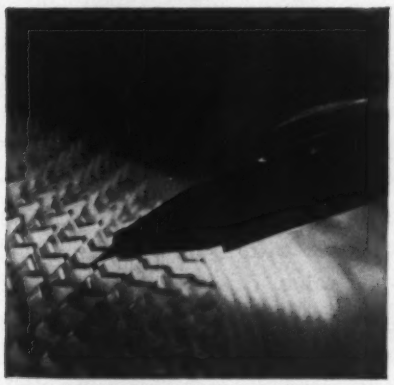
NOW, BROACHES PRODUCE MORE PIECES FASTER

They're also producing pieces with finer finishes and greater accuracy – because they're made of continually-improved Rex® High Speed Steels.

New broach designs and new broaching machines now enable you to mass-produce complex shapes in a matter of minutes. Furthermore, every piece is finely finished to within micro-inch tolerances.

What is behind this development? It's the increased skill of the broach tool makers, combined with Crucible's progress in making better high speed steels.

To produce the fine steels needed for broaches, Crucible tool steel specialists make use of the most advanced electronic instrumentation available today. For example: they use precision instruments to control the temperature of the molten metal in the melting furnace. So, each heat is produced under identical conditions.



CHECKING THE TOOTH SPACING OF HELICAL INVOLUTE SPLINE. Finishing teeth on broaches made of Rex High Speed Steels reproduce shapes within tolerances of a few ten-thousandths of an inch.

Crucible tool steel specialists employ new techniques that greatly improve deoxidation of the liquid steel. They also use new ingot mold designs that provide freedom from segregation when the steel solidifies. And they ultrasonically inspect every billet of Rex High Speed Steel before rolling or forging.

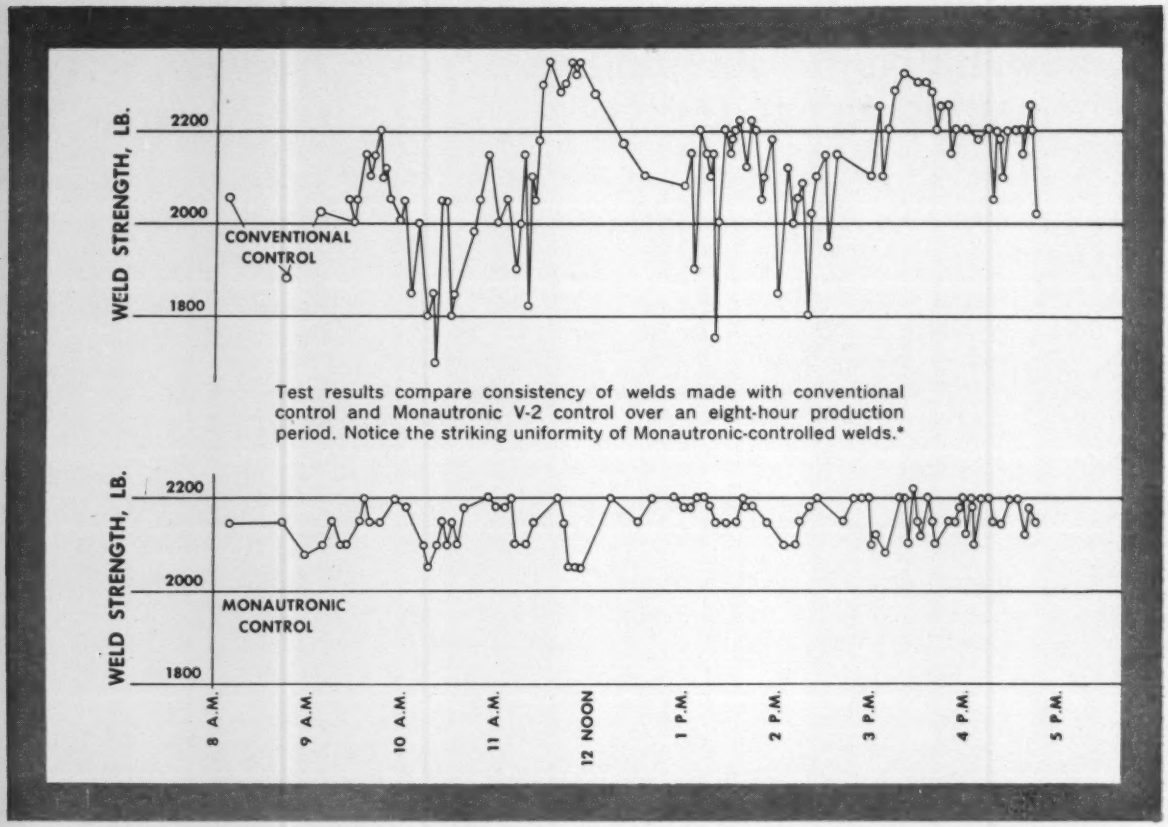
Today Rex High Speed Steels continue to make the best broaches because they offer *1.* more uniform distribution of carbides throughout the section. This ensures minimum size change, greater predictability in heat treatment, greater hardenability and more uniform hardness in the heat-treated tool. And *2.* more uniform distribution of sulfides in the free-machining grades—which provides improved machinability and superior surface finish.

To make precision tools better with Crucible's Rex High Speed Steels, call or write the nearest Crucible branch office or warehouse.

BETTER TOOLS, THROUGH BETTER STEELS. The constant improvement of Rex High Speed Steels ensures the increasingly better performance of hobs, taps, twist drills and cutters—as well as broaches.

CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Caldwell, N. J. • Charlotte Chicago • Cincinnati • Cleveland • Columbus • Dallas • Dayton • Denver • Detroit • Erie, Pa. • Grand Rapids • Houston • Indianapolis • Los Angeles Miami • Milwaukee • Minneapolis • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City San Francisco • Seattle • Springfield, Mass. • St. Louis • E. Syracuse • Tampa • Toledo • Tulsa



Test results compare consistency of welds made with conventional control and Monautronic V-2 control over an eight-hour production period. Notice the striking uniformity of Monautronic-controlled welds.*

new feedback control gives you consistently high quality welds . . . automatically

Monautronic V-2 welding control has fully automatic sequencing with all provisions for single spot, roll spot and seam welding.

The new *Monautronic V-2* welding control makes use of the latest advances in electronic computing to overcome automatically such obstacles to weld quality as line voltage fluctuation, electrode wear, variations in electrode tip force, surface finish and shunting.

The control compensates for undesirable variations usually encountered in resistance welding by maintaining voltage across a weld at a constant value. This constraint of voltage amounts to constraint of final weld temperatures, and such temperature control assures uniform production of high quality welds.

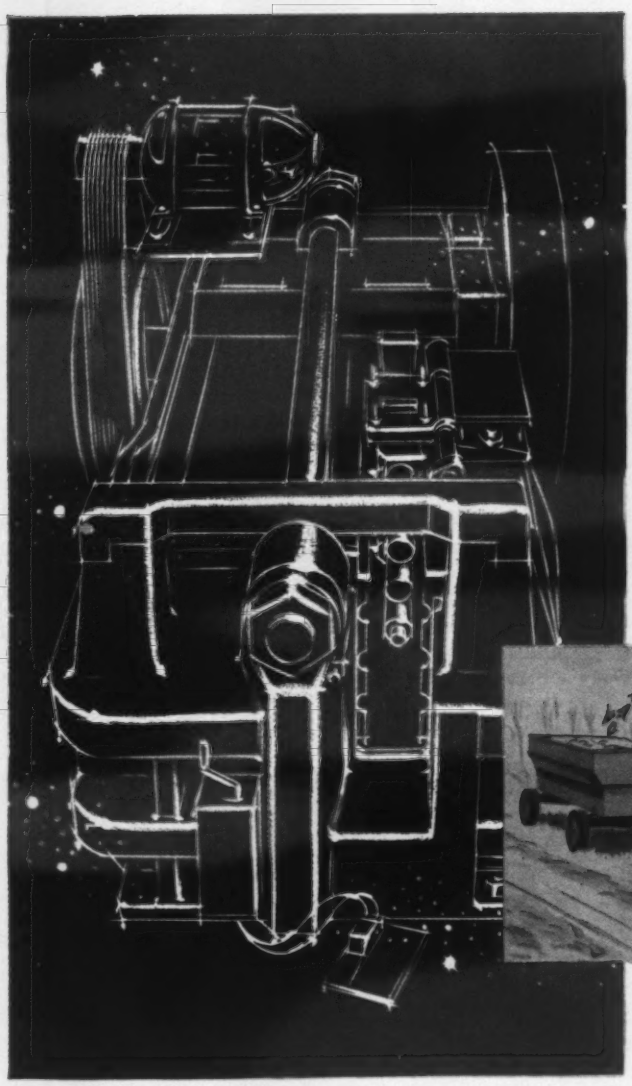
Any metal that can be resistance welded can be welded better with the Monautronic V-2 than with any other control on the market.

For complete details, contact THE BUDD COMPANY, Electronic Controls Section, Philadelphia 32, Pa., or one of our regional offices.

*Case study upon request.

2450 Hunting Park Ave. Philadelphia 32, Pa. ▪ 12141 Charlevoix Ave. Detroit 14, Mich. ▪ 3050 East 11th St. Los Angeles 23, Cal.

ELECTRONIC Budd CONTROLS



RESISTANCE TO PUNISHMENT of any severe-service part increased by designing it to be forged

Upsetter, or horizontal forging machine

Gear blanks for tractor and farm implement transmissions are designed to be upset-forged, usually with integral forged stub shafts. Forging gives these vital parts maximum resistance to gear-clashing shifts. Transmission life can be equal to equipment life when gears are FORGED.

When you *design with forgings* right from the start, you take full advantage of the many benefits which only forgings offer: highest ratio of strength to weight . . . highest resistance to impact, shock, vibration, torsion . . . preferential orientation of flow lines in the forging to concentrate strength where required . . . absence of wasteful inclusions and voids.

Forged parts start out as *better* metal . . . are made *even better* by the hammer blows or pressures of the forging process. Write for literature to help you design, specify, and procure forged parts.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine

It's electrifying!

The ways Reynolds Aluminum improves performance, cuts costs

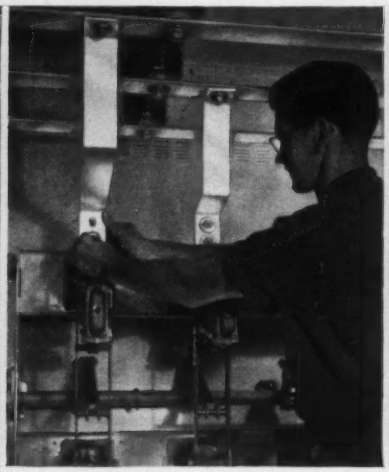
One dollar's worth of aluminum will do the same electrical work as two dollars' worth of copper. Add other aluminum advantages to this fact and it's easy to understand why products made *by* Reynolds Aluminum and products made *with* Reynolds Aluminum are helping the electrical industry reduce costs and increase efficiency.

Manufacturers of electrical equipment, utilities, and power users all benefit from the increased use of Reynolds Aluminum. And no wonder, when you consider the unique combination of advantages offered by aluminum.

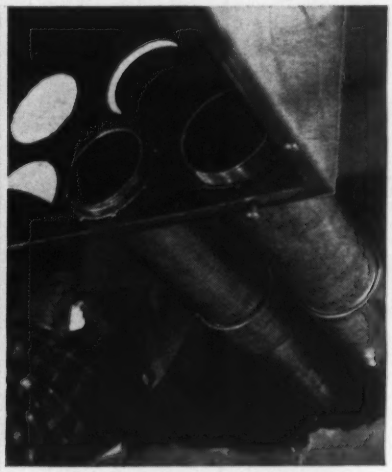
For example: low cost, minimum maintenance, easier installation, attractive appearance, high electrical conductivity, light weight, resistance to corrosion, high thermal conductivity, strength, ease of fabrication, good availability and high scrap value.

The electrical industry is one example of where, how and why Reynolds Aluminum is adding value. For details on how aluminum can help you improve product performance, reduce weight and cut costs, contact your nearest Reynolds office or write *Reynolds Metals Company, P. O. Box 2346-GN, Richmond 18, Virginia.*

Reynolds Aluminum Strip Conductor offers cost and performance advantages over wire coils. It is easy to wind, improves heat transfer, saves insulation, weight and space. In a new automotive horn coil it helped eliminate eleven parts. Available interleaved or anodized.

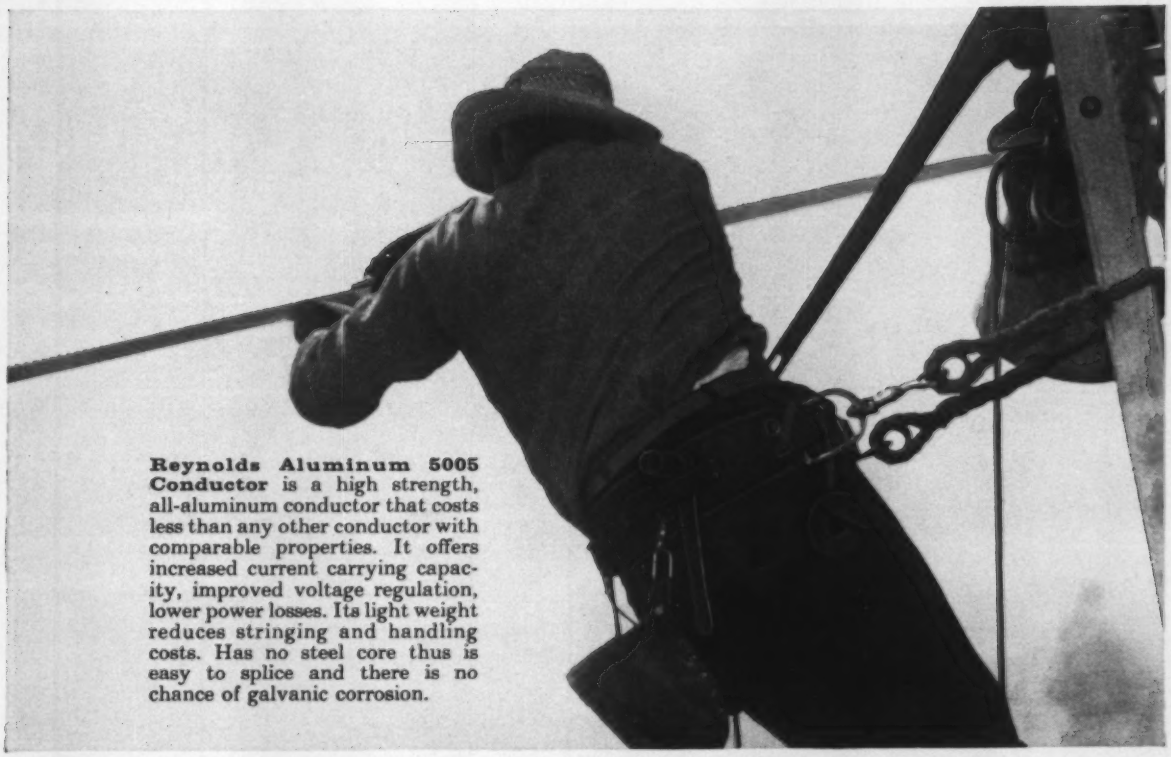


Reynolds Aluminum Bus Bar offers savings of 35 to 50% over bare or plated copper conductors. It is lightweight, easy to cut, bend and form—reduces installation costs. Ideal in switch-gear, bus duct, sub-stations and other equipment. Available bare or silver plated in a variety of sizes and shapes.



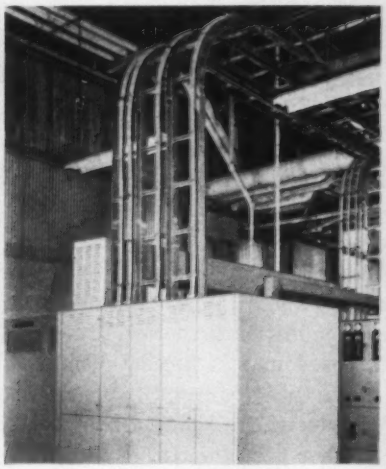
Reynolds Aluminum Rigid Conduit cuts installation and maintenance costs. Weighs only one-third as much as steel conduit, resists corrosion from most industrial atmospheres, is easy to cut, bend and form. Non-magnetic, reduces voltage drop, often permits longer runs, smaller conductors.

REYNOLDS



Reynolds Aluminum 5005 Conductor is a high strength, all-aluminum conductor that costs less than any other conductor with comparable properties. It offers increased current carrying capacity, improved voltage regulation, lower power losses. Its light weight reduces stringing and handling costs. Has no steel core thus is easy to splice and there is no chance of galvanic corrosion.

Reynolds Aluminum Telephone Booths are available for both indoor and outdoor installations. They are low in cost, lightweight, easy to set up singly or in tandem. Strong, weather-resistant aluminum members never need protective painting, will not rust, warp, chip or peel.

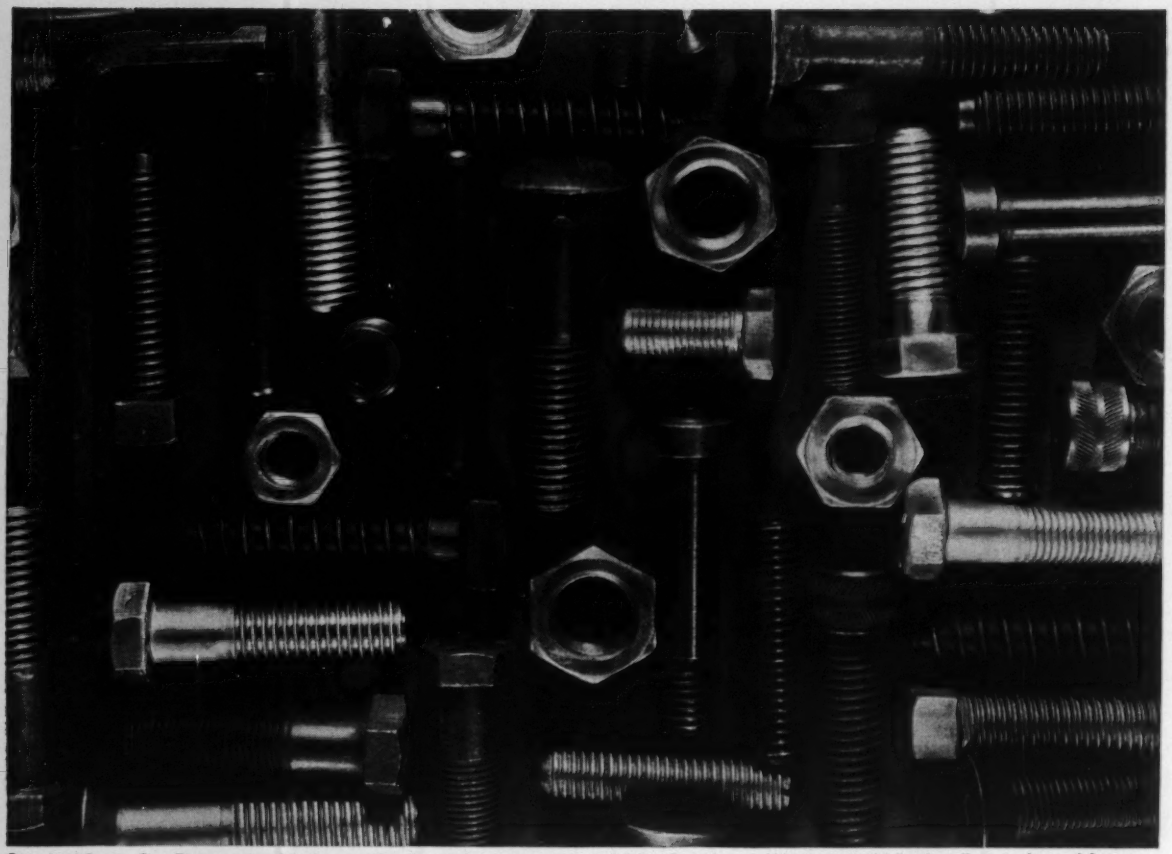


Interlocked Armor Cable Systems are a good example of Reynolds Aluminum used in electrical equipment. Strong, lightweight, rustfree aluminum as the conductor, armor cover, supporting trays and shield-tape reduces handling and maintenance costs, adds to performance and attractiveness.

Outdoor Switchgear is another example of aluminum's versatility in electrical equipment. Extruded aluminum sections that interlock to form structurally reinforced panels reduce labor costs, provide strength and rigidity in housings. Panel sections are light in weight, easy to handle, won't rust.

ALUMINUM

Watch Reynolds TV Shows: "Bourbon Street Beat" and "Adventures in Paradise"; and, resuming in October, "All-Star Golf"—ABC-TV



Standard Screw Co.: Thousands of fasteners, like those above, are produced daily. Speedomax H helps spheroidize heading stock used for many of these Stanscrew fasteners.

Reproducing annealing temperatures a problem?

Not for Standard Screw Co. at its Chicago Screw Co. Div., Bellwood, Ill., where Speedomax® H is helping to spheroidize 60 tons of coil a day for later production into Stanscrew fasteners. As part of their modernization and expansion program, Standard Screw recently installed one of the fastener industry's first continuous, pusher-type Surface Combustion furnaces . . . equipped it with Speedomax H controllers. After more than a year of operation, Speedomax H is reliably maintaining the selected time-temperature program . . . helping to reproduce again and again 85% spheroidization of pearlite in the structure of SAE-1038, 1041 and several low-alloy steels. Rugged and compact, this modern controller is providing equally dependable control for many other heat treating processes . . . helping to produce both process economies and a quality product. *Whatever your heat treat, it'll pay you to investigate Speedomax H!* For details, contact your nearest L&N office, or write 4956 Stenton Ave., Phila. 44, Pa.

Six Speedomax H controllers regulate temperature of six furnace zones, reliably reproducing process temperatures 24 hours a day, 5 days a week.

LEEDS NORTHRUP

Instruments Automatic Controls • Furnaces

TIN PACK

STEEL is a tin can, world's most practical container. It seals in the sparkle of your favorite soft drink. It makes your beer chill faster, takes less space in your cooler. It guards the flavors of your favorite foods. With hundreds of other products, from oil and paint to detergents and shaving cream, tin cans and closures provide strong, safe, lightweight, unbreakable convenience for you. Tin plate for tin cans is another miracle of steel—another leading product of Youngstown, a growing force in steel.

YOUNGSTOWN STEEL is quality tin plate. For right through final close visual inspection, Youngstown controls not only basic steel quality, but tin plate quality itself. You can get the temper and gauge you want from two modern full range Youngstown tin mills at strategic Indiana Harbor. Here, Youngstown's new continuous annealing facilities and new coil finishing capacity help deliver cost-cutting answers to your tin "pack" needs. For quality tin plate, count on Youngstown, a growing force in steel.

Youngstown – growing force in steel

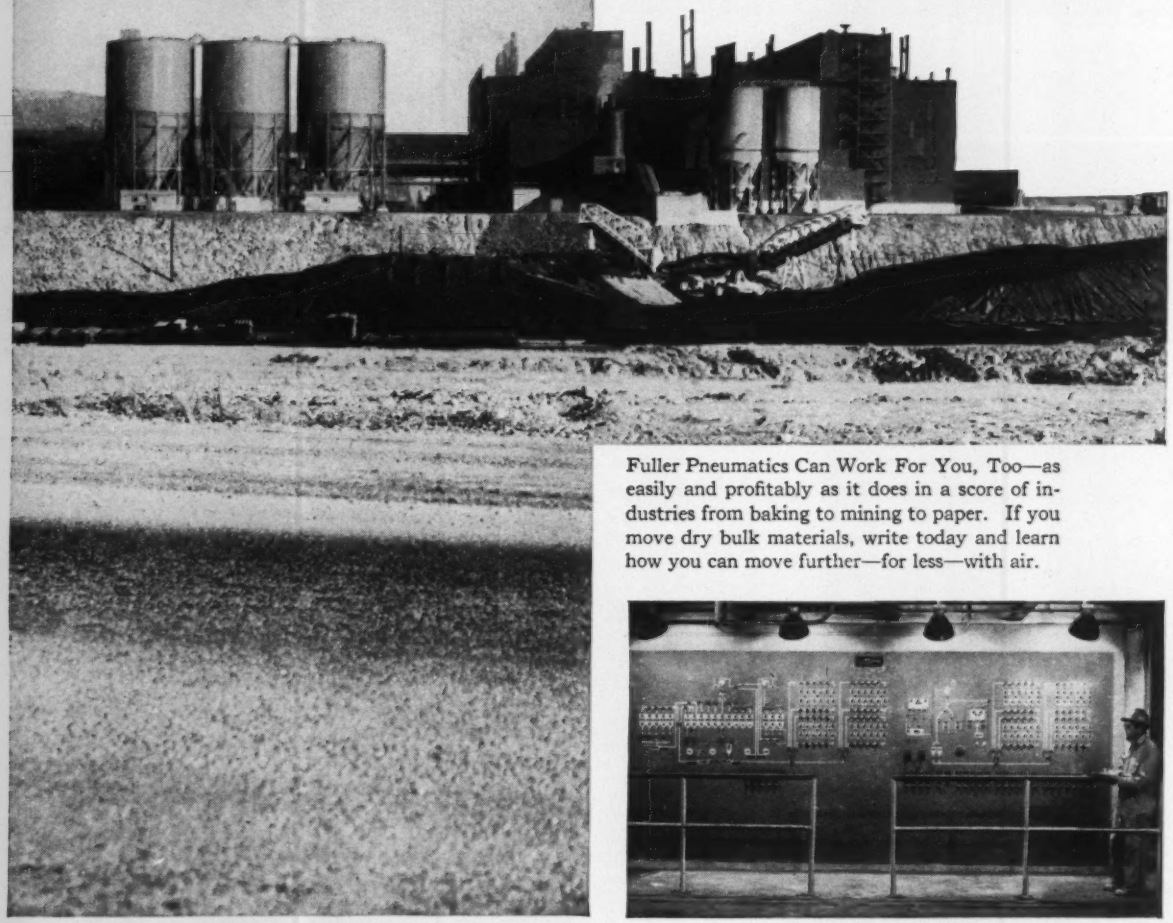
THE YOUNGSTOWN SHEET AND TUBE COMPANY, YOUNGSTOWN, OHIO. ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND COLUMBUS DALLAS DENVER DES MOINES DETROIT GRAND RAPIDS HOUSTON INDIANAPOLIS KANSAS CITY LOS ANGELES MILWAUKEE MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS SAN FRANCISCO SEATTLE TULSA WASHINGTON

How Pneumatic Conveying Helps Make New Mining Process Economically Practical

Taconite processing is typical of the many varied, cost-saving applications for Fuller Pneumatic Conveying.

They're turning low assay iron ore into rich pellets on the Mesabi these days. Moving additives for pelletizing, Fuller plays a special role in this feat of engineering and production economy.

Fuller Pneumatic Conveying Systems are carrying fine anthracite screenings, soda ash, and bentonite from siding to storage to processing—with speed, safety, sanitation, and efficiency. With few moving parts to wear out and powered by inexpensive low-pressure air, Fuller Pneumatic Conveying Systems speed dry bulk materials *anywhere that a pipeline can be run:* under ground, up through floors, around corners . . . for far greater distances and at substantially lower cost than possible with mechanical conveyors.



Four Fuller Pneumatic Systems can speed more than 307 long *tons* of additives through this huge Taconite Pelletizing Plant in a single day.

Fuller Pneumatics Can Work For You, Too—as easily and profitably as it does in a score of industries from baking to mining to paper. If you move dry bulk materials, write today and learn how you can move further—for less—with air.

Centralized control is provided by giant panel designed and manufactured by Fuller.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY
122 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

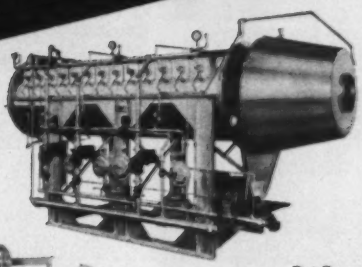
Fuller
. . . . pioneers in harnessing AIR

2097
G229

THE BEST IN HEAT TREATING EQUIPMENT SINCE 1878

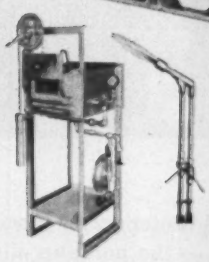
Since 1878, American Gas Furnace Co. has been manufacturing only the very finest of heat treating equipment and accessories for every conceivable type of metal treating for all phases of American industry.

Regardless of your needs . . . automatic or manual . . . large pieces or small . . . complete automatic production lines or well made small accessories . . . there is a quality AGF product to fill the bill — Write now for the new and complete furnace and burner catalog.



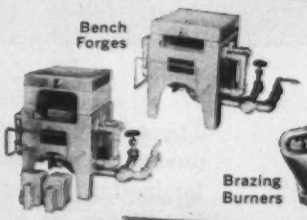
Continuous and Batch Rotary Furnaces

Pot Furnaces



Hand Blow Pipes

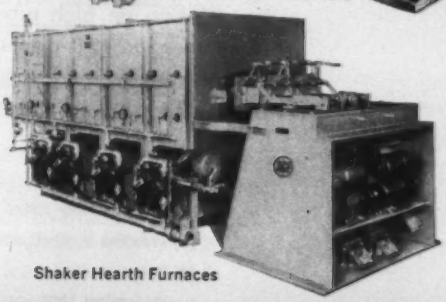
Bench Forges



Tool Room Ovens

Brazing Burners

Ammonia Dissociators



Shaker Hearth Furnaces

AMERICAN GAS FURNACE CO.
82 YEARS OF PIONEERING 1878 1960
ELIZABETH, N. J.

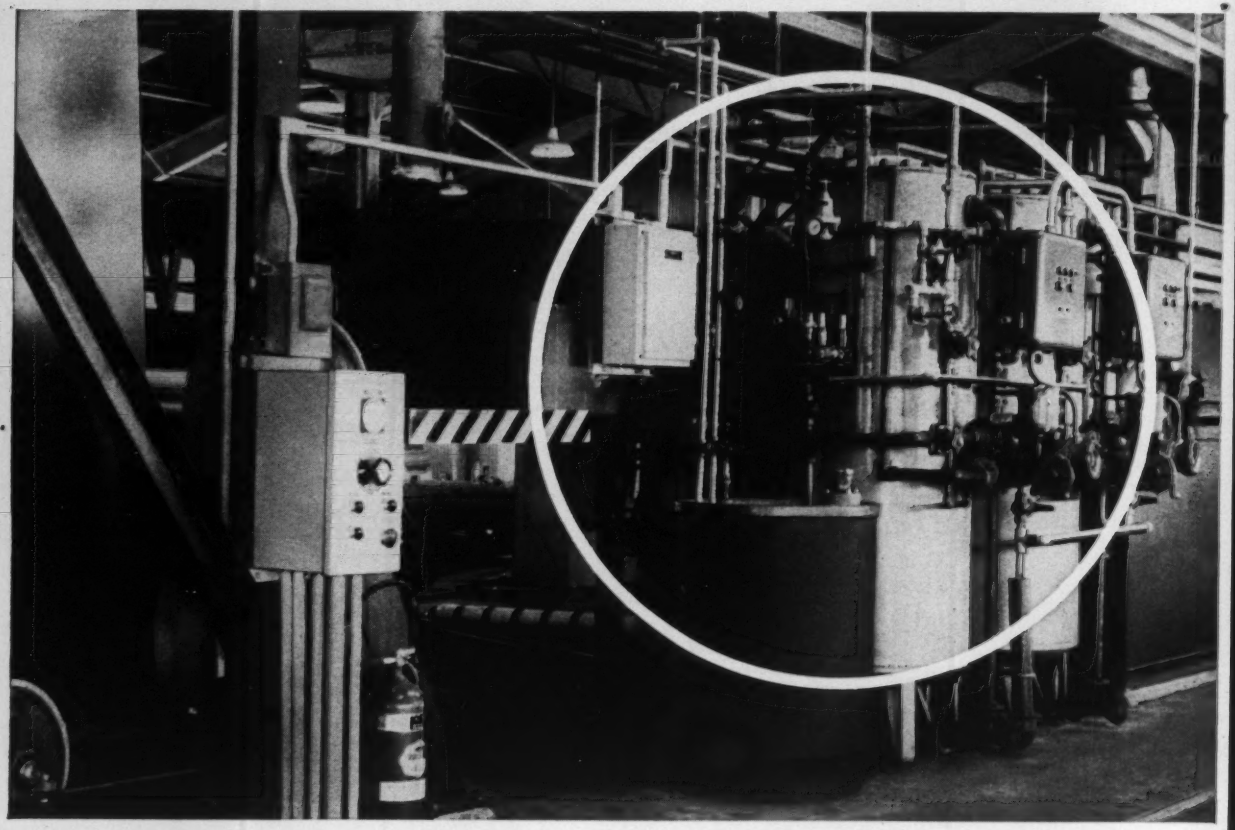
AMERICAN GAS FURNACE CO.
PIONEERS 1878

INDUSTRIAL GAS EQUIPMENT DIVISION
CODE OF ETHICS SIGNER
GAS APPLIANCE MANUFACTURERS ASSOCIATION

AMERICAN GAS FURNACE CO.

1004 LAFAYETTE STREET • ELIZABETH 4, N. J.

NOW! A QUALITY for BONDERITE coatings



This quality control center solves a serious production problem — the build-up of contaminating reaction products in the processing solution on high production strip lines for conversion coatings on aluminum.

It eliminates the formation of sludge and the need to dump the coating bath, ever.

It results in:

(1) Uniform quality
(2) Positive solution control
(3) Reduction in rejects and downtime
(4) Reduction of chemical consumption because the coating bath operates at low concentration
(5) Minimum sewage disposal problem

How Parker Reactifier maintains quality

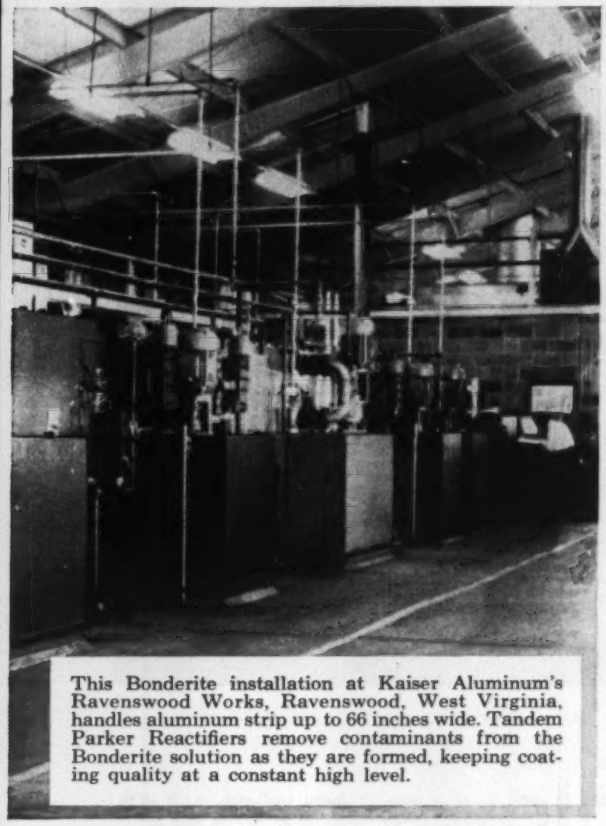
As aluminum is treated in any conversion coating solution, there's a build-up of reaction products, mainly aluminum and trivalent chromium, in the bath. Continued operation without removal of these impurities means slower coating action, sludge formation, and irregular and inferior coatings.

The control or removal of the interfering impurities stymied manufacturers for years until Parker developed the Parker Reactifier for use with Bonderite in high production aluminum lines.

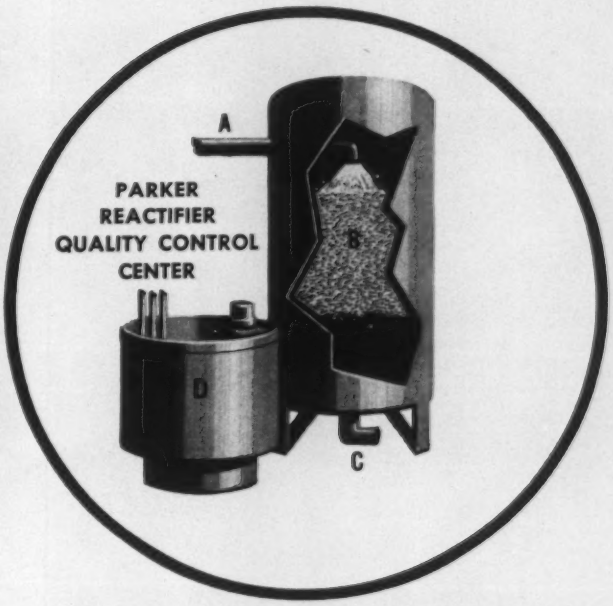
The Parker Reactifier is an ion exchange unit connected in the circulation system of the processing solution. As Bonderite flows down through the cation resin bed in the Reactifier, aluminum and chromium are removed and the purified Bonderite is re-

CONTROL CENTER

on high production aluminum strip lines



This Bonderite installation at Kaiser Aluminum's Ravenswood Works, Ravenswood, West Virginia, handles aluminum strip up to 66 inches wide. Tandem Parker Reactifiers remove contaminants from the Bonderite solution as they are formed, keeping coating quality at a constant high level.



The Parker Reactifier, "Quality Control Center" of Bonderite for aluminum on high production strip lines. Bonderite enters at "A"; resin "B" removes impurities by cation exchange action; purified solution is returned at "C." Regeneration of the unit is accomplished by circulation of acid from tank "D" to cleanse resin of accumulated impurities.

turned to maintain the coating bath at top efficiency.

Proven by years of use

One Parker Reactifier has been in continuous use for over three years on a Bonderite high production aluminum strip line. In all that time there has been no deterioration of the cation resin, no sludge build-up, and no reason to discard the bath. This manufacturer now is installing a second strip line for Bonderizing aluminum with another Parker Reactifier for quality control.

In the comparatively short time Parker Reactifiers have been available, the largest manufacturing and fabricating plants have installed 30 of them to assure high quality coatings on aluminum.

You'll be proud of the finish on your product when you use Bonderite before painting. It improves paint life five to ten times. Call in the Parker man today!

Bonderites for aluminum meet MIL-C-5541 specifications.

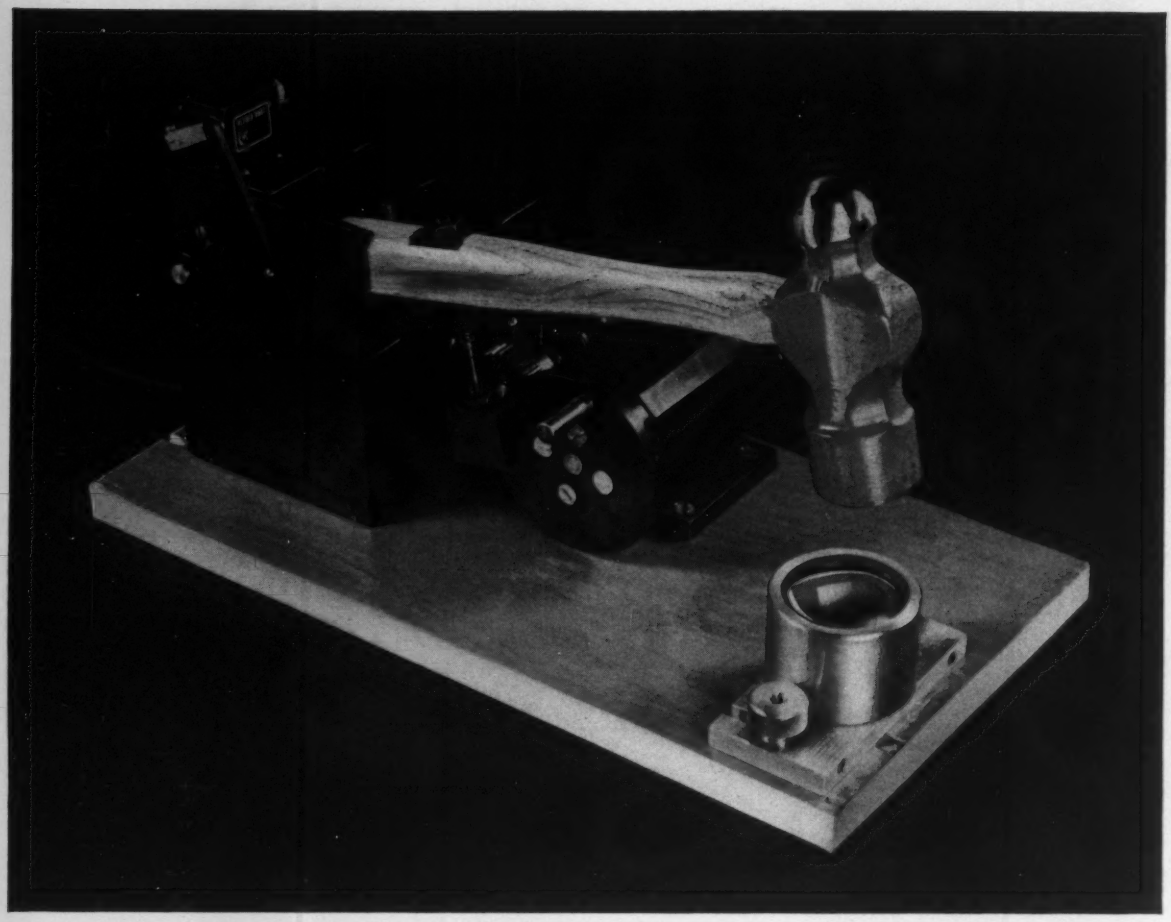
Parker Rust Proof Company
2197 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base • BONDERITE and BONDERLUBE aids in cold forming of metals • PARCO COMPOUND rust resistant • PARCO LUBRITE—wear resistant for friction surfaces • TROPICAL—heavy duty maintenance paints since 1883

Since 1914—Leader in the field

*Bonderite, Bonderized, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

Since 1914 — leader in the field



381,198 blows prove Bal-SAFE lens protection

Here is dramatic proof of the extra margin of safety your workers get when their eyes are protected with Bal-SAFE impact resistant lenses—regular or prescription ground to personal vision needs.

Each blow of this 2-lb. steel hammer struck the polished surface of a regular industrial thickness (3mm) Bal-SAFE lens with a force of .87 foot pounds. The lens, supported only around its edge by a hard rubber ring, resisted days of continuous hammering at the rate of 22 blows per minute. Not until the 381,198th blow did it finally shatter.

Through an exclusive toughening process, Bal-SAFE lenses average a minimum of 6 times the impact resistance required by the U.S. Bureau of Standards. Each lens undergoes a special large-orifice quenching operation that uses big amounts of air at carefully controlled temperatures. The entire lens surface gets the blast at once. The process is the same whether for prescription safety lenses finished locally at your B&L laboratory, or for plain safety lenses finished at the B&L factory.

Held securely in extra strong B&L Safety Frames, Bal-SAFE lenses provide the utmost in eye protection, visual efficiency, and worker comfort. Want to know more about them? Call your B&L supplier, or drop a line to: Bausch & Lomb, 98506 Lomb Park, Rochester 2, N. Y.

BAUSCH & LOMB

Protection PLUS Safety Products

protection + economy + worker acceptance

your product's reputation and sales... can go down hill fast

... if nuts keep coming loose

Suppose you were your own customer, and bought the product *you* make. You'd expect it to stand up to the job, whether it was a racing cart, a heavy-duty crawler, or a crusher. You'd want it to endure the bumps and thumps and constant vibration of rugged use without coming unstuck at the bolts. If a nut came loose and made you lose time or production, you'd certainly think twice about buying that product again.

This is precisely why so many of America's leading manufacturers have guaranteed the reliability of critical bolted connections on their products with Elastic Stop® nuts.

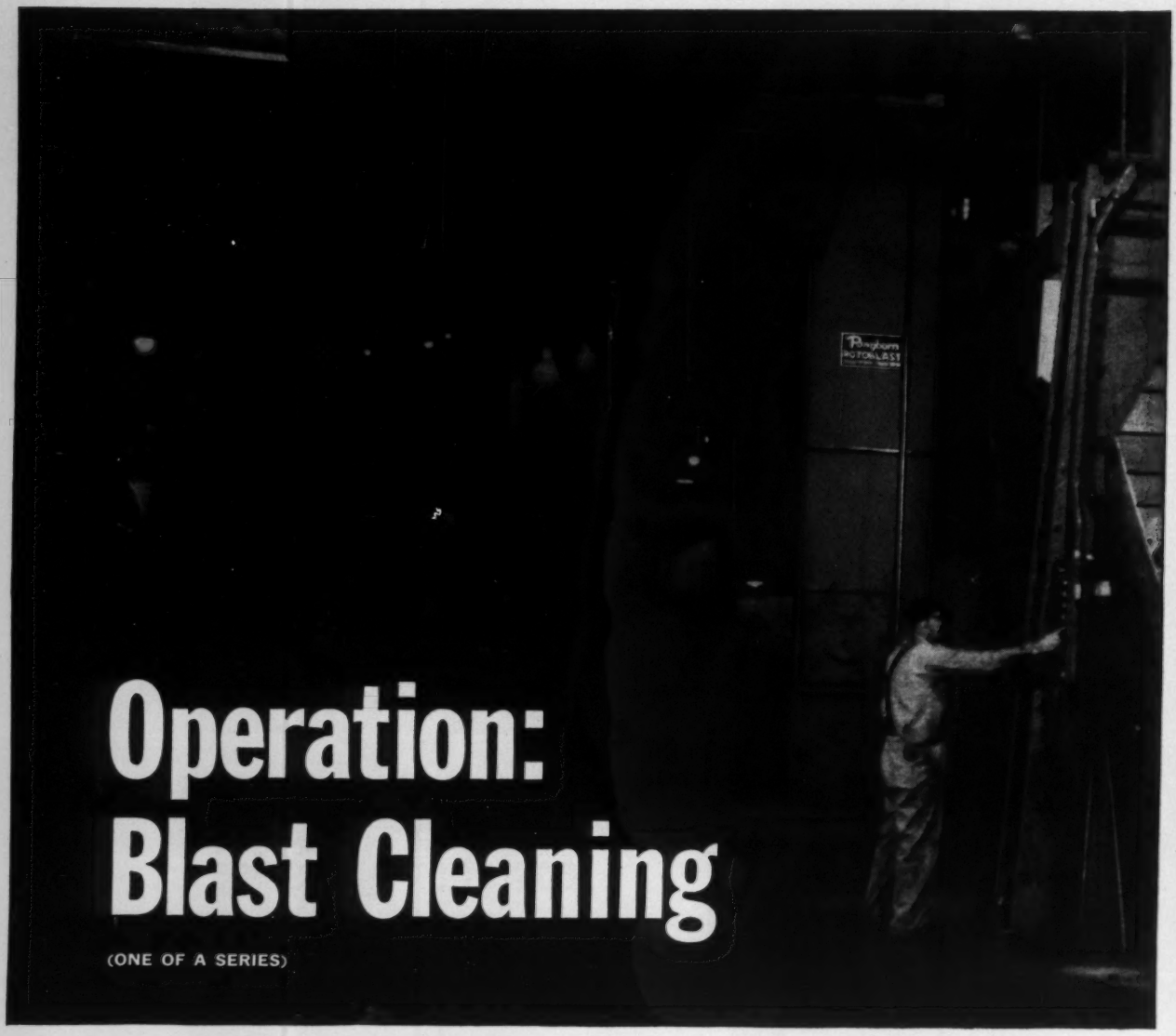
They know that a product's reputation for dependability is built in the field and they know that reorders are written in customers' maintenance records. They've verified through field experience that in the long run Elastic Stop nuts pay their own way because the exclusive nylon locking inserts keep them from working loose . . . even under the most punishing conditions of shock, impact or vibration! Elastic Stop nuts are the equivalent of "free" insurance against fastener failure for *their* product!

Whether your product sells for three dollars or for thousands, we think you'll be interested in a copy of the hex nut catalog No. 706. It details the regular, thin, heavy and light hex types in USS and SAE thread series and various materials and finishes; plus many dimensional "specials".

ESNA's complete line may change many of *your* "special" requirements into standard parts. Write Dept. S52-677, Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.

for the ring **O** *of reliability*

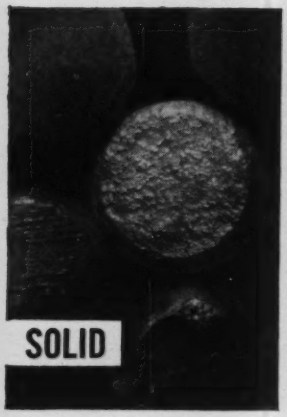
ELASTIC STOP NUT CORPORATION OF AMERICA



Operation: Blast Cleaning

(ONE OF A SERIES)

Pangborn Rotoblast proves itself again



Carrier Corporation, Syracuse, N.Y.—Pangborn Rotoblast cleans so quickly it has cut cleaning department labor costs 30% to 40% . . . saving $15,000 a year.

Master Electric Company, Dayton, Ohio—Two 12 cu. ft. Rotoblast Barrels with automation reduce labor costs by 50%—save $15,000 a year in manpower alone! Clean 33 tons of gray iron castings a day with ease.

Meadville Malleable Iron Co., Meadville, Pa.—Pangborn Roto-

And Rotoblast Steel Abrasives

In foundries, forges, steel and metal working plants all over America, premium quality Rotoblast Steel Shot and Grit are replacing other metal abrasives as they *prove* their ability to blast clean at lower cost. Lansing Drop Forge Co.—a typical

Typical Rotoblast Barrel, Ft. Pitt Steel Castings Co., McKeesport, Pa.

...and again...and again...and again!

blast cut 24 man-hours daily to 15 . . . cleans loads three times as large in half the time.

Ingersoll Rand Co., Painted Post, N.Y.—Pangborn Rotoblast cleans 74,000 lbs. of castings per day, cuts cleaning time in half and substantially reduces costs.

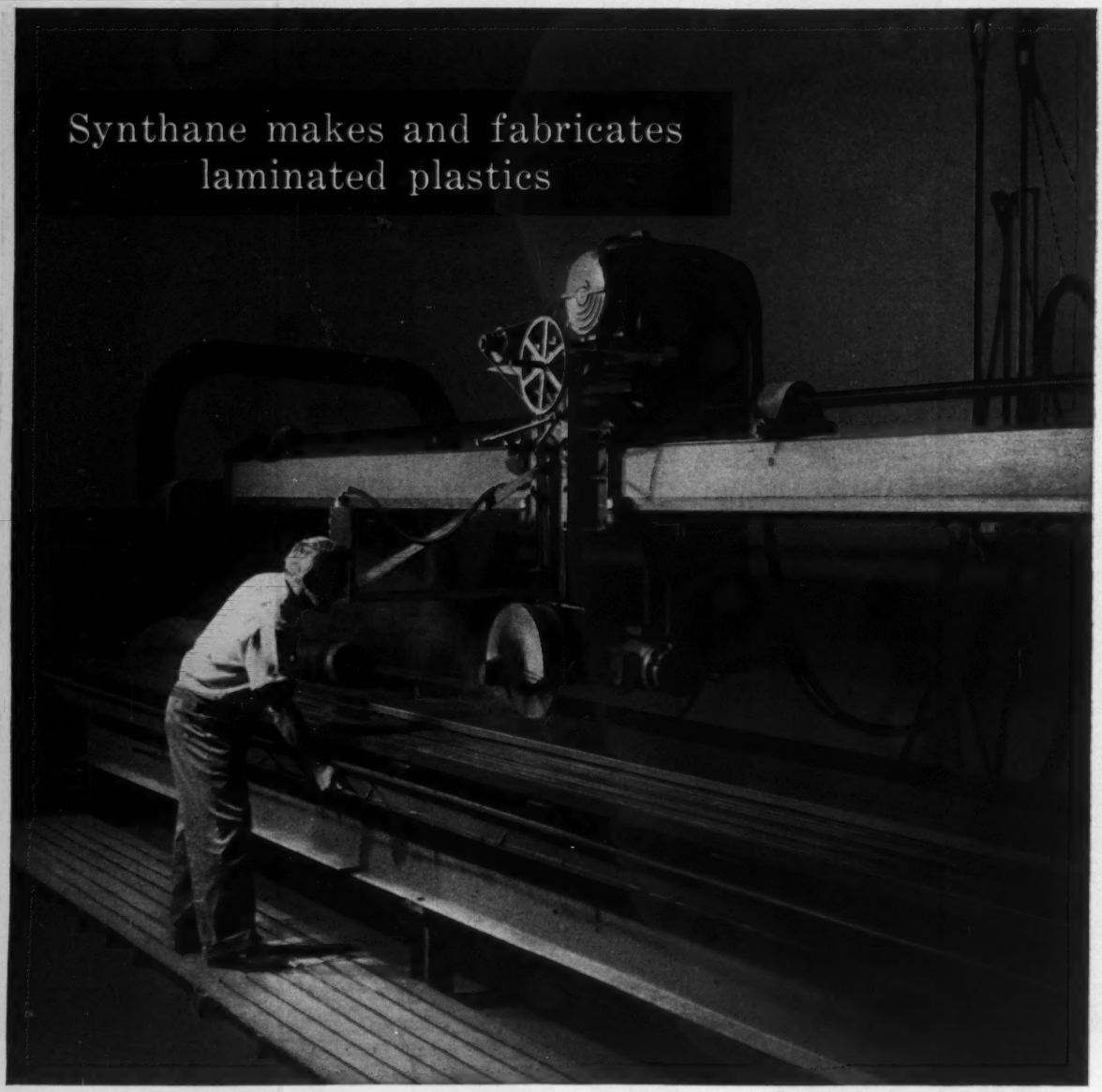
Buckeye Iron & Brass Co., Dayton, Ohio—Pangborn Rotoblast is automated to reduce labor requirements even further, cuts 15 minutes blast time to just 4½.

Results like these explain why two of the world's leading automotive manufacturers have just ordered *nine* 32 cu. ft. capacity Rotoblast Barrels! If your problem involves blast cleaning, talk to your Pangborn man or write PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning, Vibratory, Dust Control Equipment—Rotoblast® Steel Shot and Grit.®*

prove their value, too!

user—switched to Rotoblast S-390, cut abrasive cost by 23%. An Ohio foundry cut shot consumption from 27 lbs. per wheel hour to 7.8 lbs. with Rotoblast S-330. Let us show you what Rotoblast abrasives will do for you.

Pangborn
OF HAGERSTOWN



Why "do-it-yourself" fabrication seldom pays

This is a "long length" saw, especially built to cut sheets of Synthane laminated plastics of over 25 feet in length.

It is extremely improbable that you would ever have sufficient work to make the purchase of such a machine profitable. Yet the long length saw is only one of hundreds of unusual machines necessary for fast, accurate, economical fabrication of laminates.

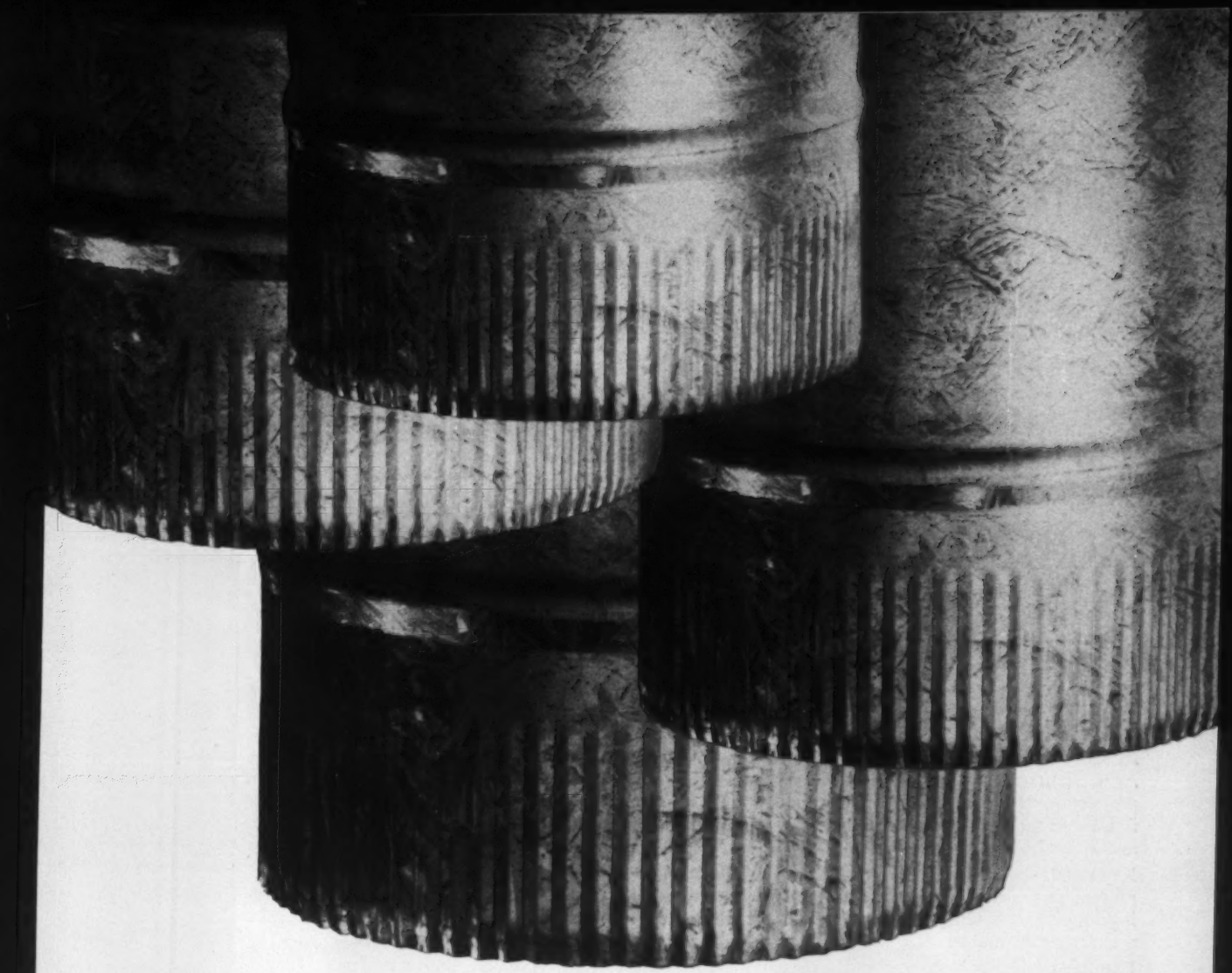
Without the advantage of special machines and tools, and faced with the possibility of errors, waste, delays, mistakes in tolerances or dimensions —at your expense—you may come to the same conclusion as have nearly all of our customers—buy your laminated plastics from us and have us fabricate them for you. Call any of our representatives—located in all principal cities—for a quotation or write to Synthane Corporation, 4 River Road, Oaks, Pa.

You furnish the print—we'll furnish the part

SYNTHANE

CORPORATION OAKS, PENNA.

Sheets • Rods • Tubes • Fabricated Parts
Molded-laminated • Molded-macerated



The more crimping you have to do, the more satisfied you will be with Weirkote Zinc-Coated Steel. There's no peeling, no chipping, no flaking. Work it to the limits of the steel base itself and the zinc coating remains intact assuring you of the complete corrosion protection that only zinc can give. Weirkote is made that way—to retain its protective zinc coating no matter how tough the forming and bending operations. A Weirton representative will gladly supply full information on Weirkote—another fine product of the Weirton Steel Company, Weirton, West Virginia.

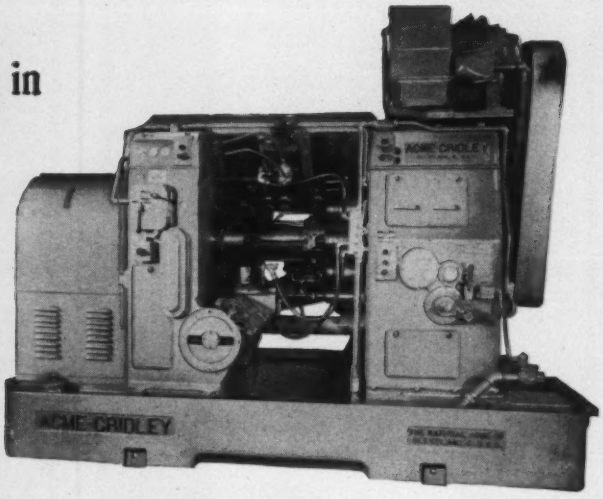
WEIRTON STEEL
Weirton, West Virginia

WEIRTON STEEL COMPANY

Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

Weirkote will also be available in 1961 from National's Midwest Steel Division, Portage, Indiana.

Major breakthrough in shaft production . . .



Acme-Gridley multiple-spindle shaft machine equals output of four automated lathes

At Chrysler Corporation's Trenton, Michigan, Engine Plant, a remarkable new National Acme shaft turning machine has slashed camshaft production costs; is hailed as a major production development for the entire industry. Performing complete shaft journal machining in a single set-up, this rugged 6-spindle automatic provides substantial savings in floor space and capital outlay, reduces scrap loss and enables closer control of machining operations.

Key to this dramatic pay-off are imaginative National Acme solutions to the difficult problems of centering, driving, and stabilizing the long, flexible shaft during turning operations. An ingenious part-holding technique exposes bearing journals for turning—an impossibility in a chucking set-up.

Extreme capability is stressed in the design of the Universal Multiple-Spindle Shaft Turning Machine and permits the maximum number of machining operations to be performed on straight or flanged shafts held between centers.

The shaft turning machine is additional evidence of National Acme know-how applied to the solution of special machining problems. This same insight and ability is available to any manufacturer interested in reduced costs and increased production. Our representative is as close as your telephone.

National Acme's "Zone of Responsibility" includes all phases of cost reduction. Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Chrysler Corporation . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.

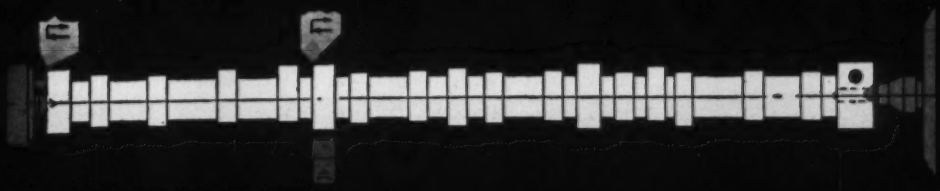
National Acme

The National Acme Company
175 E. 131st Street
Cleveland 8, Ohio

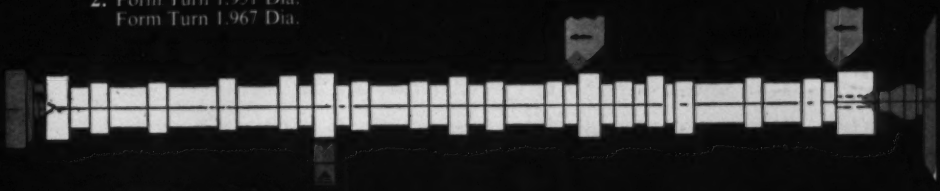
MMT=PE

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

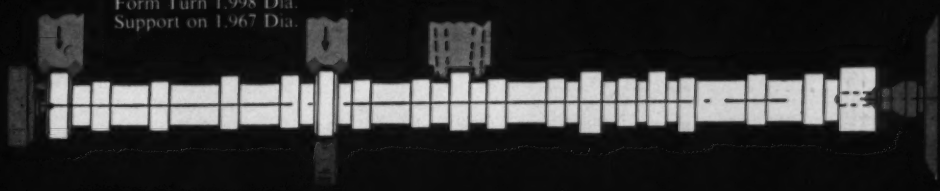
1st position—load and unload



2. Form Turn 1.951 Dia.
Form Turn 1.967 Dia.



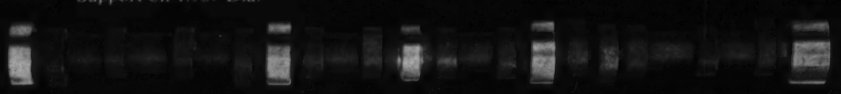
3. Form Turn 1.982 Dia.
Form Turn 1.998 Dia.
Support on 1.967 Dia.



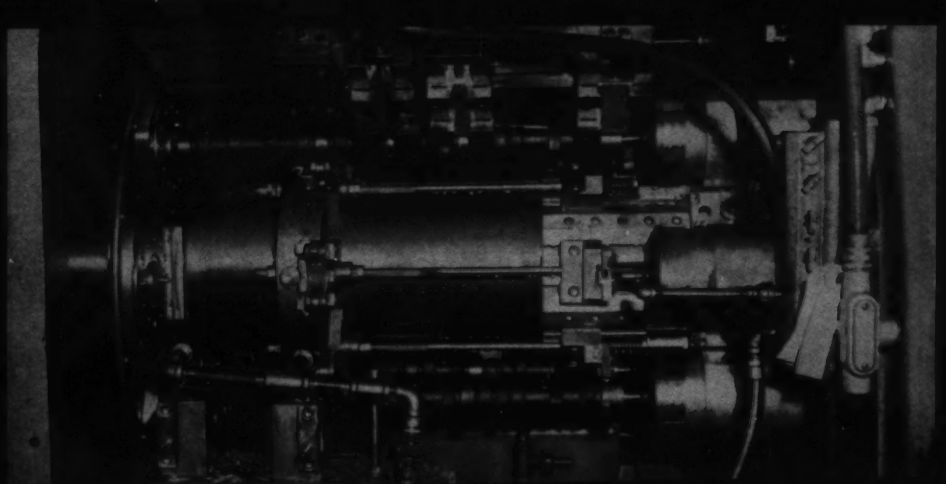
4. Chamfer O.D. of 1.951 Dia.
Chamfer O.D. of 1.967 Dia.
Face Sides of 1.743 Dia.
Support on 1.967 Dia.

5. Face End of Camshaft
Relieve Turn 1.743 Gear Dia.
Support on 1.967 Dia.

6. Chamfer O.D. of 1.743 Dia.
Chamfer O.D. of 1.982 Dia.
Chamfer O.D. of 1.998 Dia.
Support on 1.967 Dia.



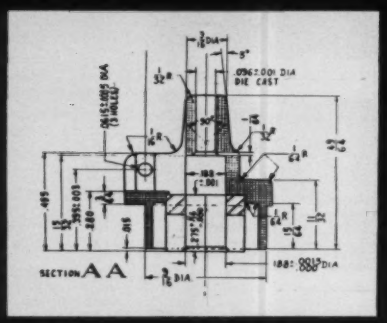
High-test cast iron camshaft with journal machining completed . . .
13 operations in 22 seconds.

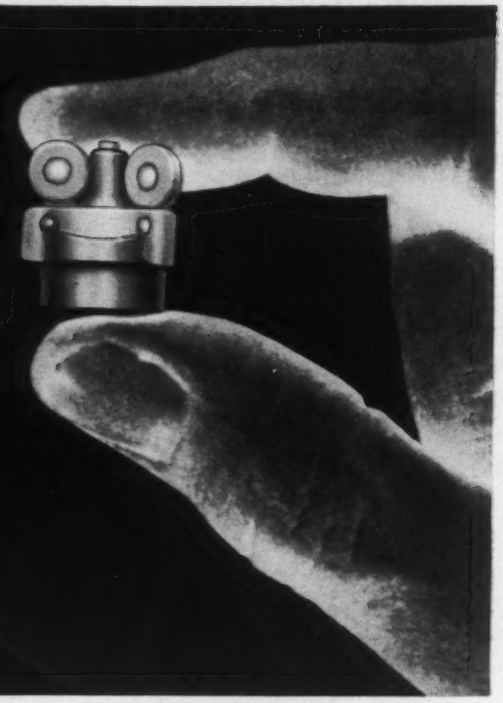


Close-up of tooling zone. Open spindle in load and unload position shows unique centering, holding and driving mechanism.

When Space is at a Premium . . .

Use ZINC DIE CASTINGS





100 of these governors are die cast per hour.

Here is an excellent example of the design engineer's adjustment to the dictum: *In all business machines, space is at a premium.*

Used in a Burroughs desk-size adding machine, the miniature governor parts shown above had to be designed to fit into an extremely small space between the motor drive housing and the keyboard section. Consideration of the following factors led to the choice of zinc in the die cast design:

1. **HIGH SPEED OF PRODUCTION**
2. **ABILITY TO HOLD CLOSE TOLERANCES**
3. **STRENGTH AND DURABILITY**

The governors are cast in a two-cavity mold. After drilling and reaming the small holes, the parts are air-cleaned and assembled with steel pins and steel flyweights.

DIE CASTING is the Process . . . ZINC, the metal . . .

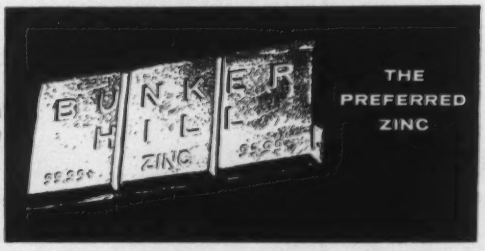
BUNKER HILL

Eastern Sales Agents:
ST. JOSEPH LEAD CO. • 250 Park Avenue • New York 17, N. Y.

BUNKER HILL 99.99+% ZINC

Sales Office For The Pacific Coast
THE BUNKER HILL CO. • 660 Market St. • San Francisco, Calif.

ZN-159



TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

With slabbers, the cooler the rolls, the longer they last

We have been somewhat concerned during the last year or so by what seems to us a more than normal number of premature roll failures in universal slabbing mills. These failures have not been limited to any one brand of rolls.

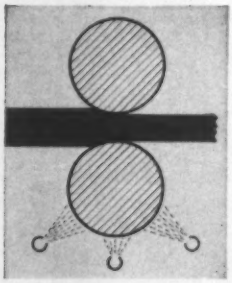
As a result, we have been checking among the many users of universal slabbers of our acquaintance, and in particular, with the operators whose mills have been giving them good outputs between roll replacements.

We think we have the answer to part of the problem, and will pass it along to you. Even if you don't operate a slabbing mill, you may find it helpful in connection with hot mill operation in general.

Not enough water. In every troublesome case that has come to our attention, too little cooling water was reaching the bottom roll, either because of an inadequate cooling system, or clogging of the spray header. Here is the way two steel plants are currently taking care of the problem:

CASE A: Water is applied to the top roll by means of a water box, with wipers on both entry and delivery sides. Three 4-inch pipes spray the bottom roll, one directly beneath the roll and the other two on the entry and delivery sides. When this mill was first installed, it had only one pipe directly beneath the bottom roll, which resulted in frequent roll breakage.

This mill is particularly careful about bringing the rolls up to working heat before beginning production. Standard practice is to pass two ingots three or four times through the mill, taking very mild reductions, with the water valves opened only half way. The two "start-up" ingots are then sent back to the soaking pit, the water is turned up to full pressure and a new, hot ingot is brought up to start the turn's regular production run.



Good blooming and slabbing mill roll-cooling arrangement utilizes two or more water lines to the bottom roll, which is usually the first to show signs of premature failure.

CASE B: This mill as delivered had only one spray header underneath the bottom roll. Bad fire cracking and roll breakage occurred almost from the day the mill was placed in production. Study of the mill showed that scale was lodging between the water pipe and the bottom roll, so that little if any cooling water was reaching the roll. Two additional water lines were brought in, each delivering its water about half way up the side of the roll. The general problem has been effectively solved by this expedient. Today, this mill at times rolls up to 140,000 tons before the rolls are redressed although normal practice is to change rolls after approximately 75,000 tons.

This is the mill described in Case A; it has an excellent record, thanks to careful control of heat in the rolls and the avoidance of sudden temperature changes.

Mack-Hemp has evolved a number of roll analyses that are especially good for slabbing and blooming work because of their combination of strength and resistance to fire cracking. Mack-Hemp *Technalloy* rolls cast from chrome-moly steel and specially heat treated offer excellent resistance to fire cracking and breakage under the most severe operating conditions. Mack-Hemp *Superalloy*, a nickel-chromium-molybdenum steel roll, turns in outstanding performance in blooming mills where side wear and fire cracking in the passes has been severe.

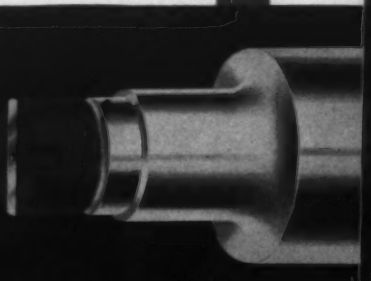
Whatever your problem of roll use, you'll find that Mack-Hemp can provide useful advice or helpful suggestions. We've been accumulating data on roll performance for more than a century and a quarter . . . it's yours for the asking. 'Phone or write us at any time.

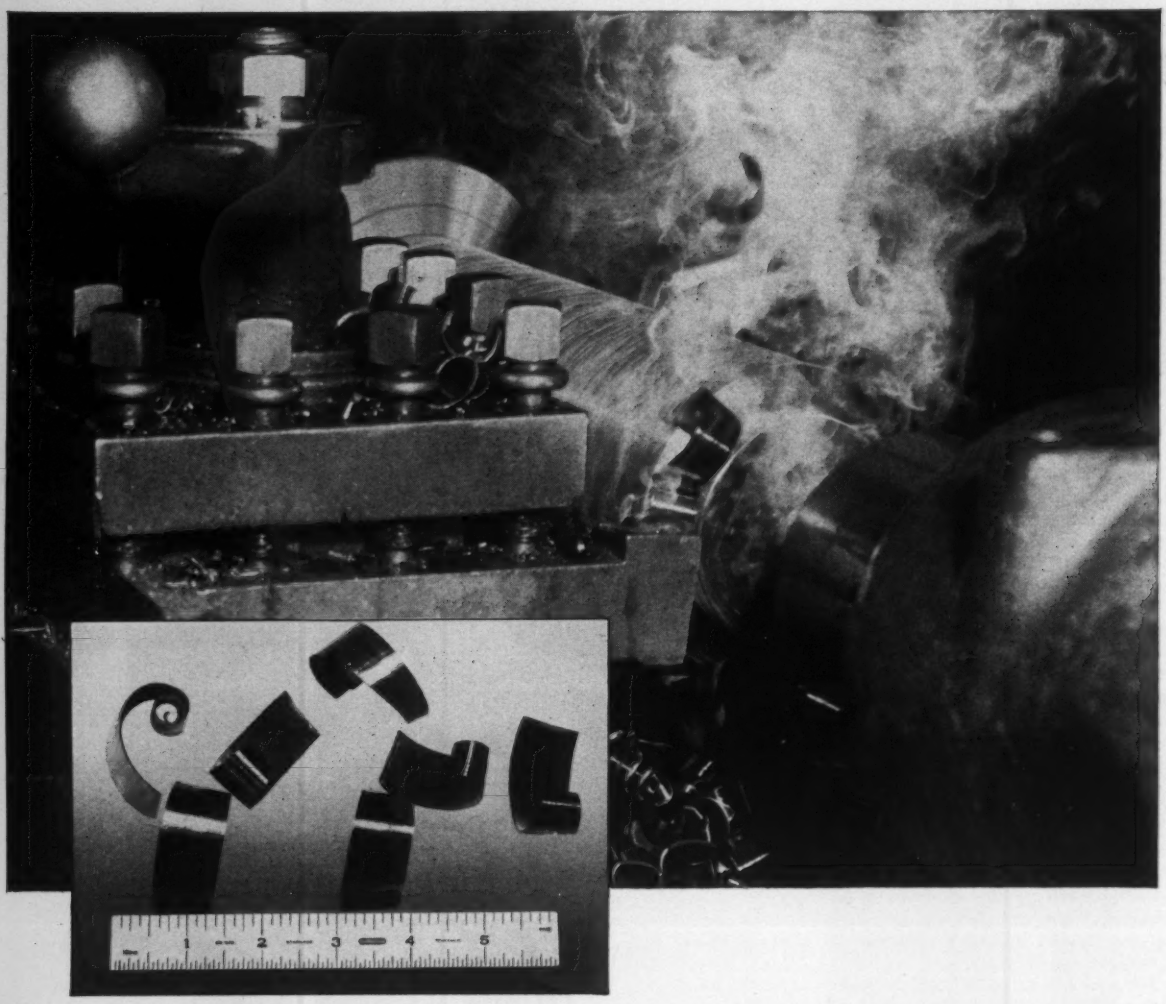
MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery





Chips like these boost machine output at HEWITT-ROBINS

The ability of VR-77 on heavy interrupted cuts gives Hewitt-Robins maximum machine output per dollar of machine investment. At their Robins Conveyors Division Plant in Passaic, New Jersey, VR-77 is used for maximum metal removal on 1045 cold rolled steel, taking a 0 to 1/8" cut at 300 s.f.p.m. with a .026" feed. Downtime has been cut in half because VR-77 removes twice as much metal per index as the previously used carbide brand.

Regardless of your particular machining problem, there's a V-R carbide specifically engineered to help you boost your machine output.

Send for Catalog VR-58 for complete details.

CREATING THE METALS THAT SHAPE THE FUTURE

V-R® VASCOLOY-RAMET®

826 MARKET STREET • WAUKEGAN, ILLINOIS

C-773

customers announce

ROEBLING'S "SPRINGKOTE WIRE"

AND THIS IS HOW THEY ANNOUNCE IT...

"Springkote Wire runs better through our coiling and knotting machines."

"The coils don't tend to stick together in the baking ovens when made with Springkote Wire."

"We're switching to Springkote Wire entirely."

And this is *why* our upholstery spring wire customers are telling you about Springkote Wire instead of us. With the advent of the electrical resistance heating method, lime-coated wire posed some problems during stress-relieving operations, burning out electrical contacts and often causing uneven heat distribution in coils. As an effective answer to the problem, Roebling developed Springkote Spring Wire, upholstery grade. Trial lots of Springkote Wire were used by some of our customers, resulting in the enthusiastic word-for-word reactions above. Incidentally, the trial lots have been extended into production lots.

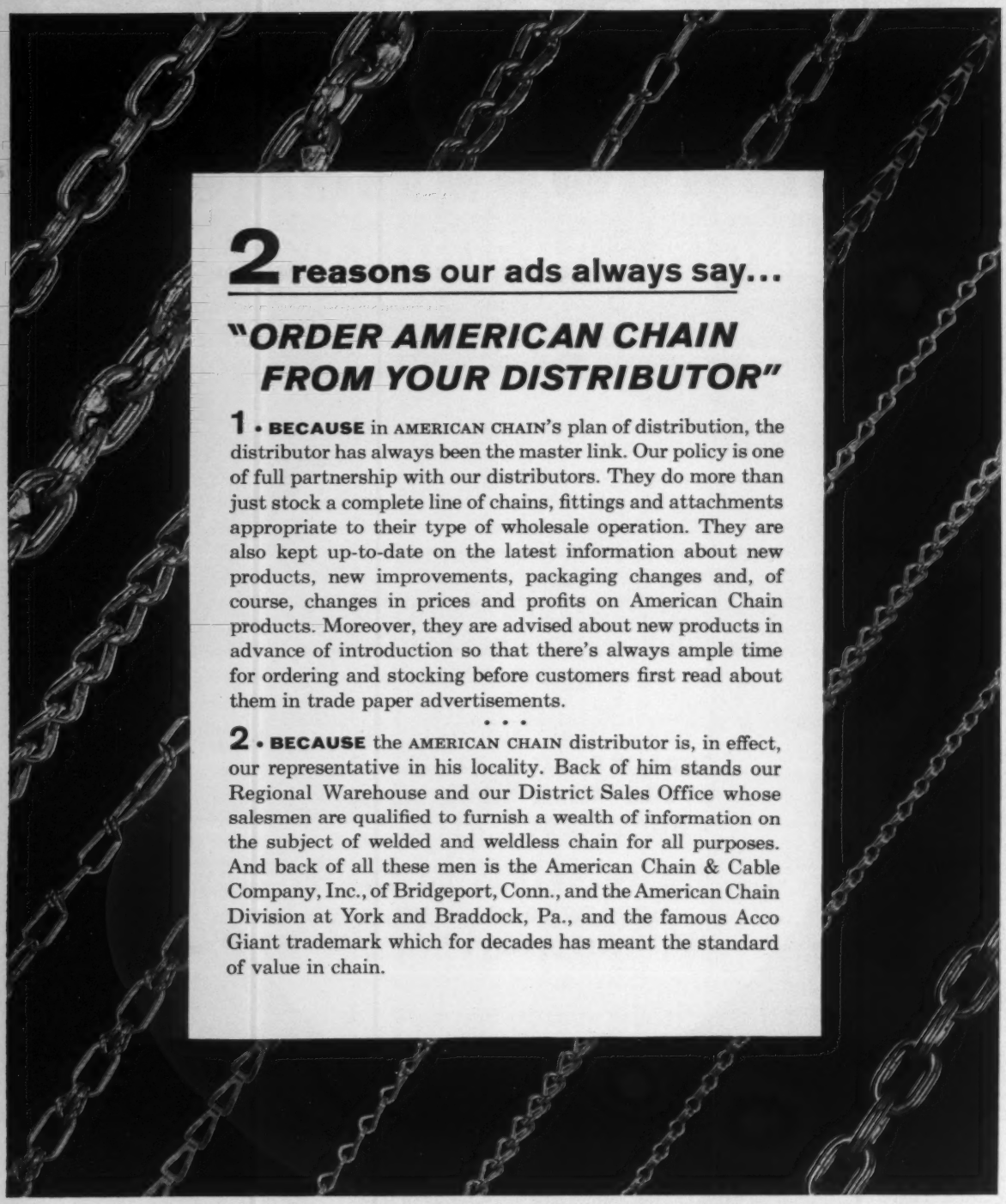
Roebling Springkote Wire paints better, bakes better and stress-relieves more evenly than whatever you're using now. (This last is *our* word-for-word reaction.)

We almost forgot to tell you that Roebling Springkote Wire costs no more than wire with the standard lime coat, which we will still supply to those who want it.

For more about Roebling Springkote Wire, write Wire and Cold Rolled Steel Products, John A. Roebling's Sons Division, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation



2 reasons our ads always say...

"ORDER AMERICAN CHAIN FROM YOUR DISTRIBUTOR"

1 • BECAUSE in AMERICAN CHAIN'S plan of distribution, the distributor has always been the master link. Our policy is one of full partnership with our distributors. They do more than just stock a complete line of chains, fittings and attachments appropriate to their type of wholesale operation. They are also kept up-to-date on the latest information about new products, new improvements, packaging changes and, of course, changes in prices and profits on American Chain products. Moreover, they are advised about new products in advance of introduction so that there's always ample time for ordering and stocking before customers first read about them in trade paper advertisements.

• • •

2 • BECAUSE the AMERICAN CHAIN distributor is, in effect, our representative in his locality. Back of him stands our Regional Warehouse and our District Sales Office whose salesmen are qualified to furnish a wealth of information on the subject of welded and weldless chain for all purposes. And back of all these men is the American Chain & Cable Company, Inc., of Bridgeport, Conn., and the American Chain Division at York and Braddock, Pa., and the famous Acco Giant trademark which for decades has meant the standard of value in chain.

ACCO

TRADE MARK

AMERICAN CHAIN

American Chain Division • American Chain & Cable Company, Inc.

Bridgeport, Conn. • Factories: *York and *Braddock, Pa., *San Francisco, Calif.

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston
*Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

*Indicates Warehouse Stocks

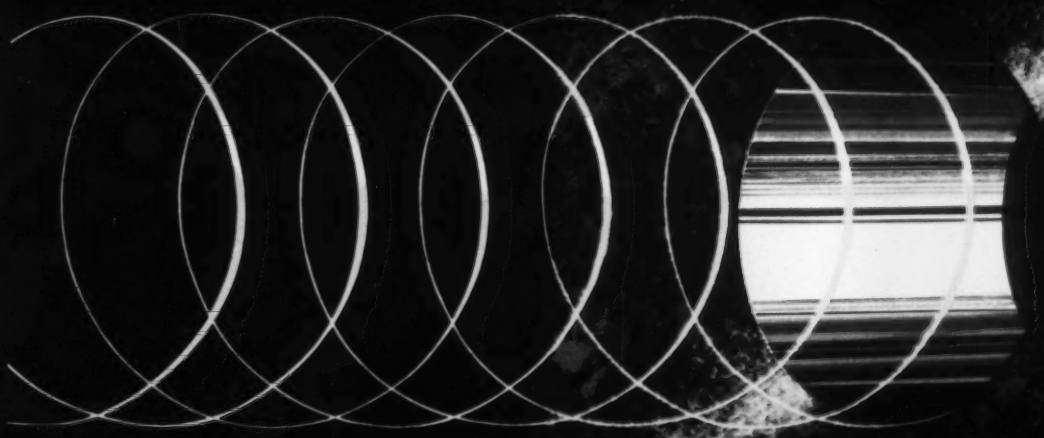
LINE BORING

STUB BORING

COUNTERBORING

ANGULAR BORING

FACE MILLING



END MILLING

ANGULAR MILLING

DRILLING

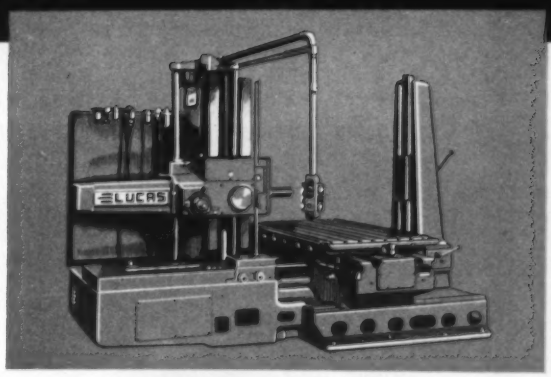
REAMING

TAPPING

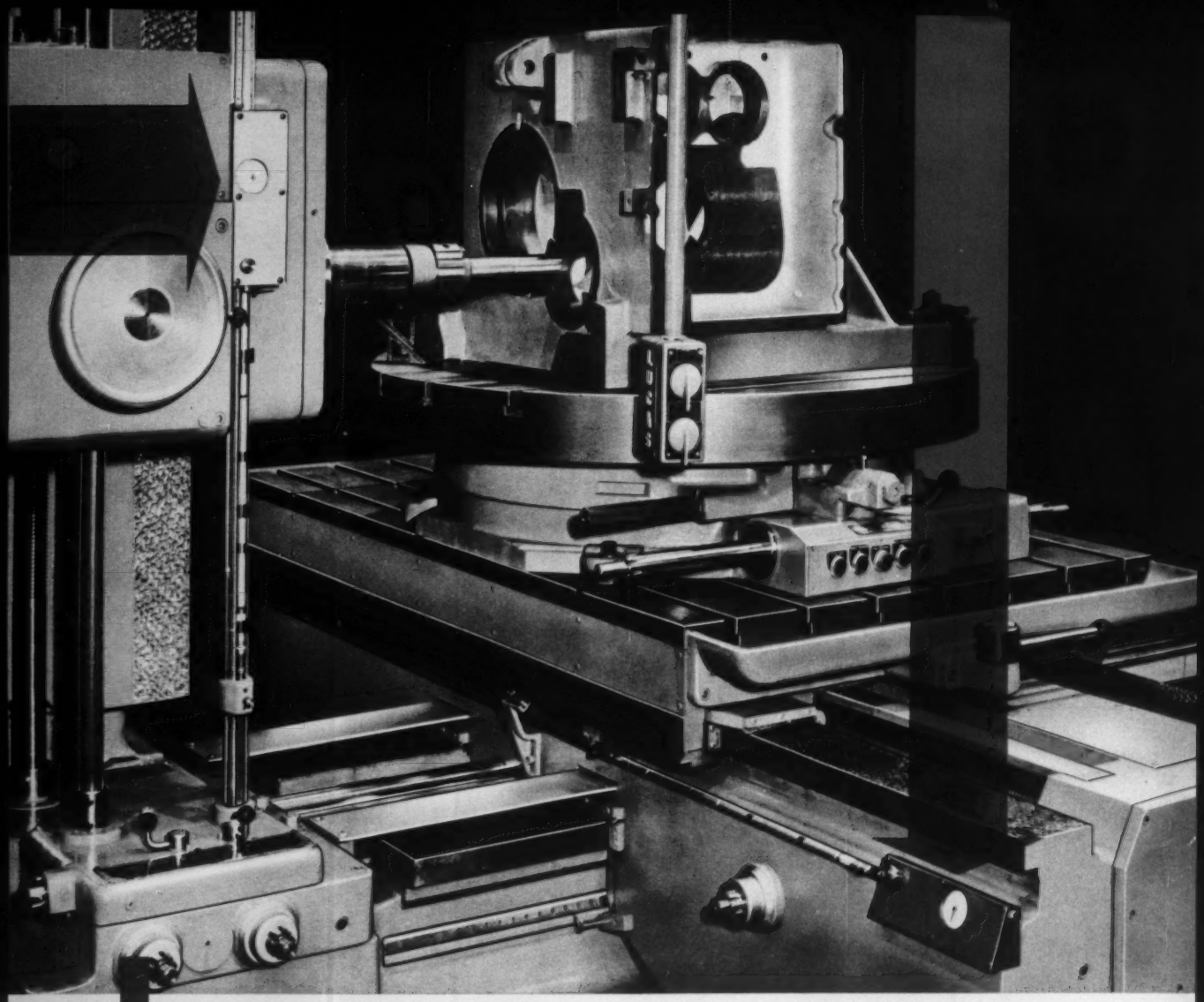
THREADING

Automatic power positioning with Lucas precision

For production or faster completion of a single piece: locates head and table to predetermined settings for boring operations. No time wasted on jigs or fixtures in drilling, reaming and tapping. Lucas versatility, precision and time saving are the keys to Lucas profitability. Lucas Machine Division, The New Britain Machine Company, Cleveland, Ohio.

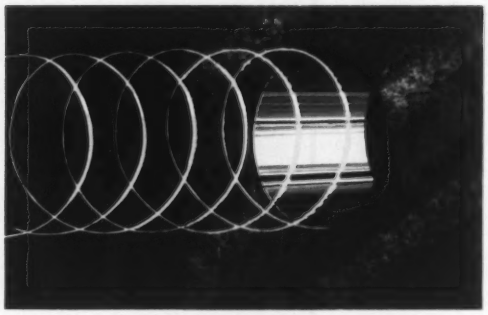


LUCAS
OF CLEVELAND



Automatic repeat settings accurate to ± .0001

Lucas Automatic Power Positioning operates at rapid traverse to locate head and table, entirely independent of operating feed rates—thru a system of end measuring rods and micrometer dial indicators. Upon starting the positioning cycle the machine does the precision setting automatically. Would you like a complete Lucas Catalog? Lucas Machine Division, The New Britain Machine Company, Cleveland, Ohio.



LUCAS
OF CLEVELAND

For parts like these . . .
barrel-finishing
is best finishing

. . . with TUMBLEX* "S"

Barrel-finishing not only gives parts the best finish — it's the fastest, easiest way to cut your finishing costs-per-piece.

To make sure of this, combine the right barrel-finishing techniques with the right abrasives. And to make sure of the right abrasives choose from the complete Norton line, which covers the entire range of barrel-finishing.

If your metal parts have hard-to-get-at areas — like any of those shown — Norton TUMBLEX "S" abrasives are your best choice. These spheres of bonded ALUNDUM* abrasive roll around and through intricate parts giving high quality and uniformity of surface finish.

Made in 5 sizes, TUMBLEX "S" spheres are made to extremely close diameter tolerances — and they wear down so slowly and evenly they can be used over and over for the same top quality finishing.

Norton TUMBLEX abrasives are all immediately available from stock. Order your selection or send sample unfinished parts to our Sample Processing Department. We'll barrel-finish samples with TUMBLEX "S" or with any other Norton TUMBLEX abrasive, if more suitable. Our report will bring you complete details on how to get the best results. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

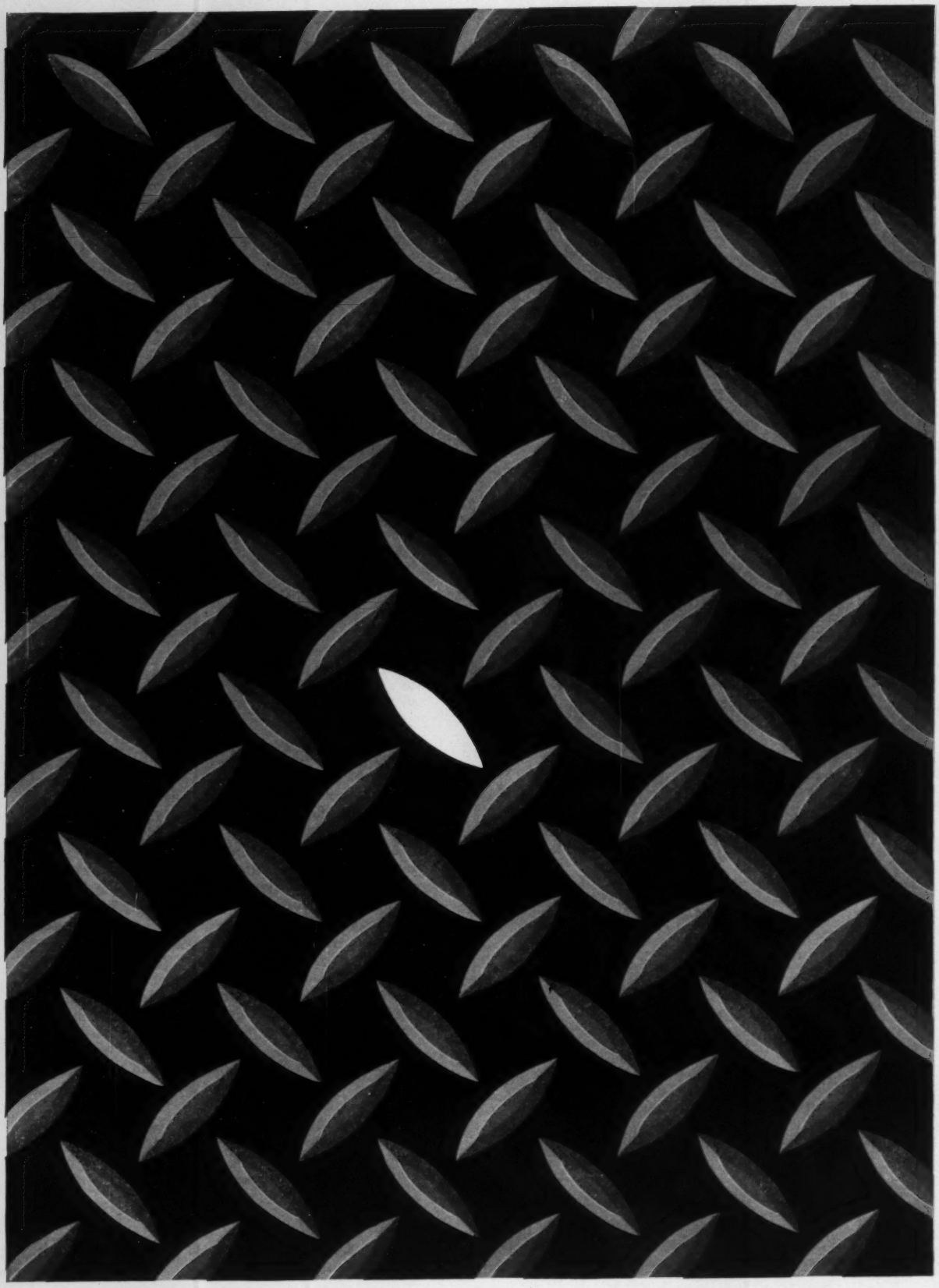
*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

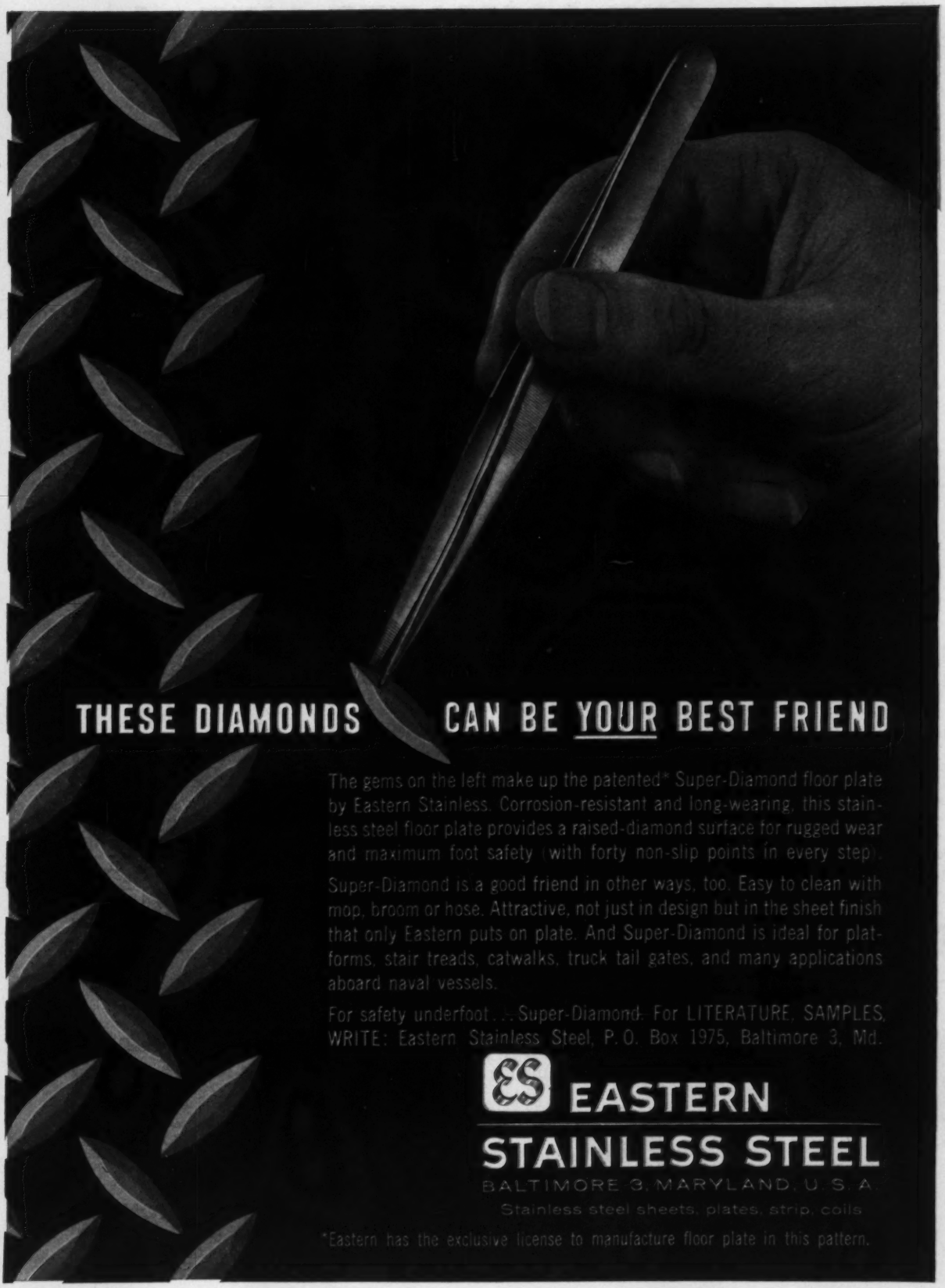
NORTON
ABRASIVES

G-397

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes





THESE DIAMONDS CAN BE YOUR BEST FRIEND

The gems on the left make up the patented* Super-Diamond floor plate by Eastern Stainless. Corrosion-resistant and long-wearing, this stainless steel floor plate provides a raised-diamond surface for rugged wear and maximum foot safety (with forty non-slip points in every step).

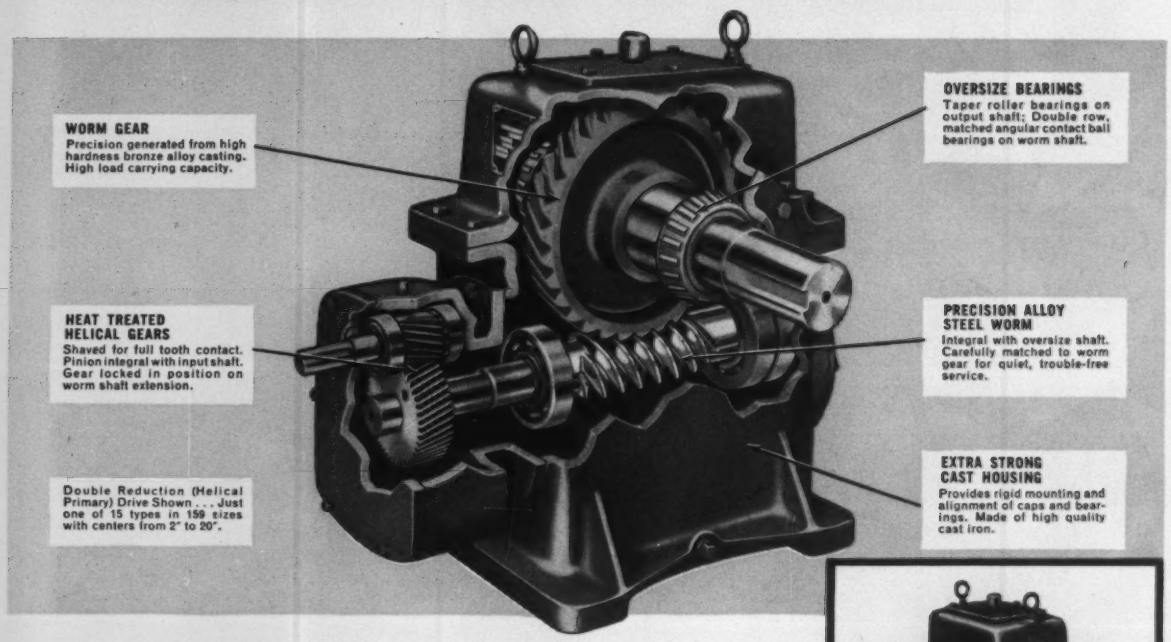
Super-Diamond is a good friend in other ways, too. Easy to clean with mop, broom or hose. Attractive, not just in design but in the sheet finish that only Eastern puts on plate. And Super-Diamond is ideal for platforms, stair treads, catwalks, truck tail gates, and many applications aboard naval vessels.

For safety underfoot . . . Super-Diamond. For LITERATURE, SAMPLES, WRITE: Eastern Stainless Steel, P. O. Box 1975, Baltimore 3, Md.

EASTERN
STAINLESS STEEL
BALTIMORE 3, MARYLAND, U. S. A.
Stainless steel sheets, plates, strip, coils

*Eastern has the exclusive license to manufacture floor plate in this pattern.

From the ONE COMPLETE LINE of Power Transmission Drives....

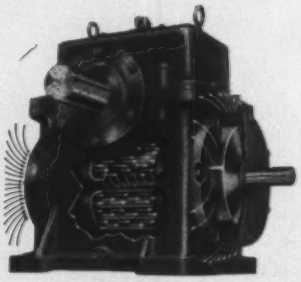

WORM GEAR
Precision generated from high hardness bronze alloy casting. High load carrying capacity.
OVERSIZE BEARINGS
Taper roller bearings on output shaft; Double row, matched angular contact ball bearings on worm shaft.
HEAT TREATED HELICAL GEARS
Shaved for full tooth contact. Pinion integral with input shaft. Gear locked in position on worm shaft extension.
PRECISION ALLOY STEEL WORM
Integral with oversize shaft. Carefully matched to worm gear for quiet, trouble-free service.
EXTRA STRONG CAST HOUSING
Provides rigid mounting and alignment of caps and bearings. Made of high quality cast iron.
Double Reduction (Helical Primary) Drive Shown . . . Just one of 15 types in 159 sizes with centers from 2" to 20".

FOOTE BROS. WORM GEAR REDUCERS DELIVER DEPENDABLE RIGHT ANGLE POWER

Gearing is the heart of any drive . . . and because more than 100 years of successful gear design and manufacturing experience go into every Foote Bros. Worm Gear Drive, they have built an unequalled reputation for performance, durability, and operating economy. Foote Bros. Worm Gear Drives are widely used in every industry in applications where dependability is a primary need.

If your drive problems involve right angle, concentric shaft, parallel shaft, or shaft mounted transmission of power, check the advantages of the complete Foote Bros. Power Transmission Line.

SINGLE REDUCTION DRIVES AVAILABLE WITH WORM UNDER OR OVER FOR HORIZONTAL OR VERTICAL MOUNTINGS.



FAN-COOLED SINGLE REDUCTION DRIVES AVAILABLE FOR HORIZONTAL OR VERTICAL MOUNTINGS.

NOW! RATED TO LATEST AGMA STANDARDS

Foote Bros. Worm Gear Drives are rated to the latest AGMA Standards. A new Catalog—HGB—just off the press, illustrates and describes Foote Bros. Worm Gear Drives. Ask your nearby Authorized Foote Bros. Distributor for a copy, or write today.

FOOTE BROS. GEAR AND MACHINE CORPORATION

4565 South Western Boulevard, Chicago 9, Illinois

POWER TRANSMISSION DRIVES

SPENDING ON NEW PLANTS AND EQUIPMENT has risen sharply to the highest level in three years and promises to keep on climbing for at least four more months, according to the government. Plant and equipment spending in 1960 is now expected to total $36.85 billion--near the 1957 record of $37 billion, and sharply above last year's $32.5 billion.

TARIFF CONCESSION HEARINGS are set in Washington. These hearings offer industry the last chance to make views known on specific import or export concessions the U. S. might seek or offer at the GATT meeting in September.

MAJOR APPLIANCE SALES DECLINE as only dishwashers and built-in ranges go up in April over same month last year. Showing: Refrigerators down 2.3 pct to 294,000; freezers down 6.3 pct to 105,800; ranges (all) down 6.7 pct to 127,000; water heaters down 25.2 pct to 53,300; dishwashers up 21.2 pct to 50,700; garbage disposers down 3.3 pct to 61,200.

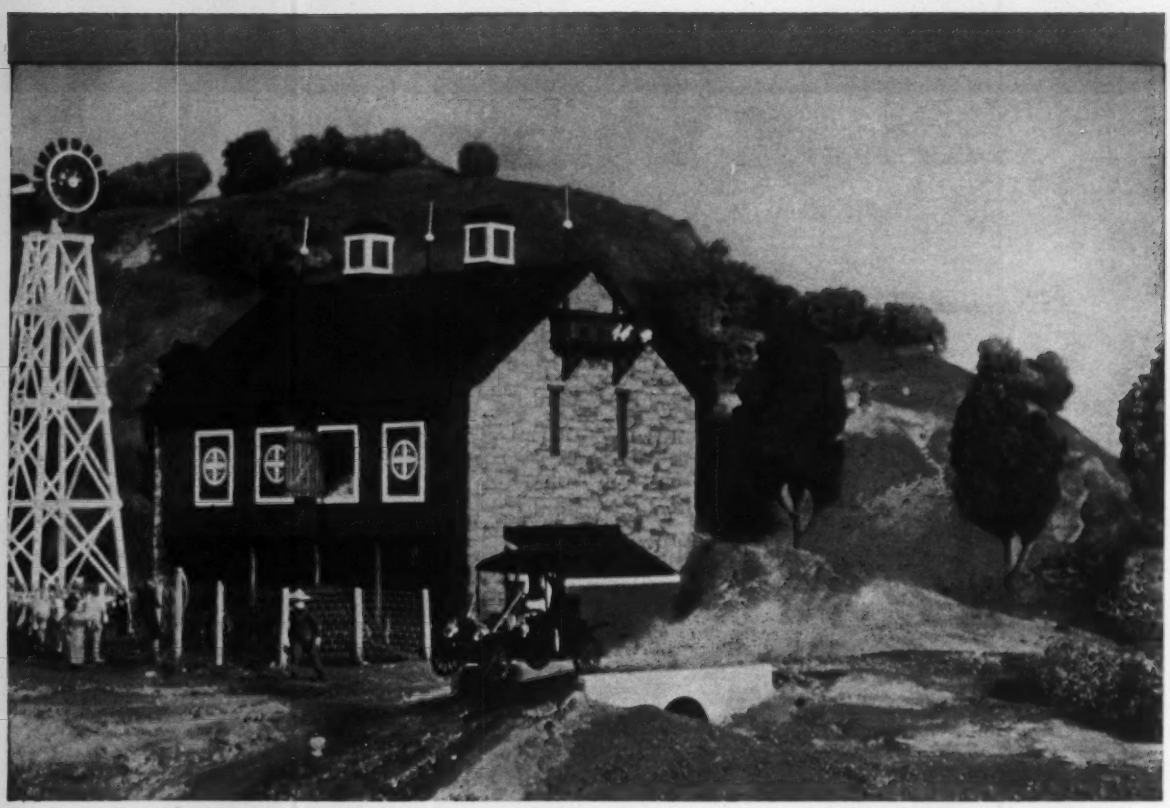
RECORD EXPENDITURES IN ELECTRIC COMPANY PLANTS and equipment are coming, reports the Edison Electric Institute. As demand for electricity soars, expenditures will soon pass $4 billion a year.

APRIL EXPORTS ARE UP, IMPORTS DOWN. April exports were valued at $1.71 billion (excluding military), an increase of about 5 pct over the March total and about 27 pct over the April 1959 total. Imports were down for the month to $1.25 billion, a 9 pct drop from March, but 3 pct above April last year.

TRUCK MAKERS EXPECT TO HIT 1960 PRODUCTION GOAL of 1.2 million units. Expected first half production of 725,000 units--now seen as "safe"--will be the best first half since 1951.

JAPAN WILL LOOK TO U.S. ROAD BUILDING EQUIPMENT, says a trade mission to that country. As Japan's highway program picks up and import controls ease, more road building equipment orders can be expected by U. S. firms. Likely needs: Heavy steel rollers, crawler-type tractors, scrapers, and large tire rollers.

WELDING SUPPLY DISTRIBUTOR SALES ARE UP by 11 pct for the first quarter this year over the same period in 1959. Higher sales are reported for all areas of the country.



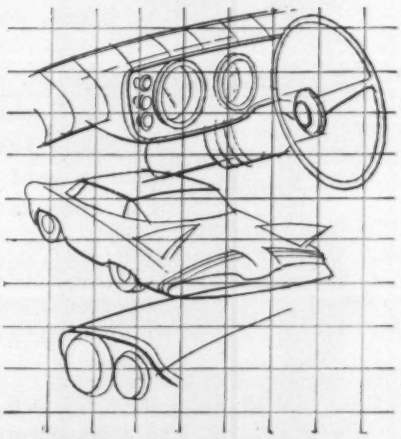
Custom Made OSTUCO Tubing..... gets your product off the ground

OSTUCO tubing is the exact tubing you need for your product because OSTUCO Tubing is CUSTOM MADE for your product. Your order is manufactured to your own specifications to produce steel tubing especially for your application—the precise grade, analysis, size, shape, special anneal and tolerances best suited to your own needs.

Ohio Seamless Tube produces both seamless and electric welded steel tubing—is prepared to form many finished or semi-finished tubular parts to your designs.

To get the most from your next steel tubing order, use Custom Made OSTUCO TUBING. Contact your nearest Ohio Seamless representative, or send part drawings to the plant at Shelby, Ohio—Birthplace of the Seamless Steel Tube Industry in America.

A-2168A



Model illustrated built to 3.5 mm scale.

OSTUCO SHELBY, OHIO

OHIO SEAMLESS TUBE

Division of Copperweld Steel Company • SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cincinnati, Dallas, Denver, Detroit (Ferndale), Houston, Los Angeles, Miami, Moline, New Orleans (Chalmette), New York, North Kansas City, Philadelphia (Wynnewood), Pittsburgh, Rochester, St. Louis, St. Paul, Salt Lake City, Seattle, Tulsa, Wichita

EXPORT: Copperweld Steel International Company, New York, Cleveland

CANADA: Railway & Power Engr. Corp., Ltd.

Sales Snap Whip on Inventories

Low Inventories Due to Buyer's Market, Not Its Cause

Four top executives clear tight inventories as a villain behind widespread idle capacity.

Inventory - sales ratios hold firm in face of declining demand. —By J. D. Baxter.

■ Suddenly, inventories are everybody's business. Businessmen don't say "buy," they say "inventory accumulation." They don't say "falling sales," they say "inventory liquidation."

In the hunt for villains behind the acres of idle capacity in metalworking plants across the country, new toughened inventory methods and practices have now been included with such familiar whipping boys as foreign competition, tight money, and depreciation taxes.

Inventory Impact—While most observers don't place the blame for idle capacity on any one element in the economy, blaming inventory practices still has reached fad proportions in some quarters. Here is how some view the villain role of toughened inventory practices:

Spot Buying—Buyers, wearing jaunty crowns in a "bargain basement" economy, are spot buying to an uncommon extent in replenishing their inventories. Heavy spot buying results in uneconomical production planning and runs, leads to costly industrial "dumping."

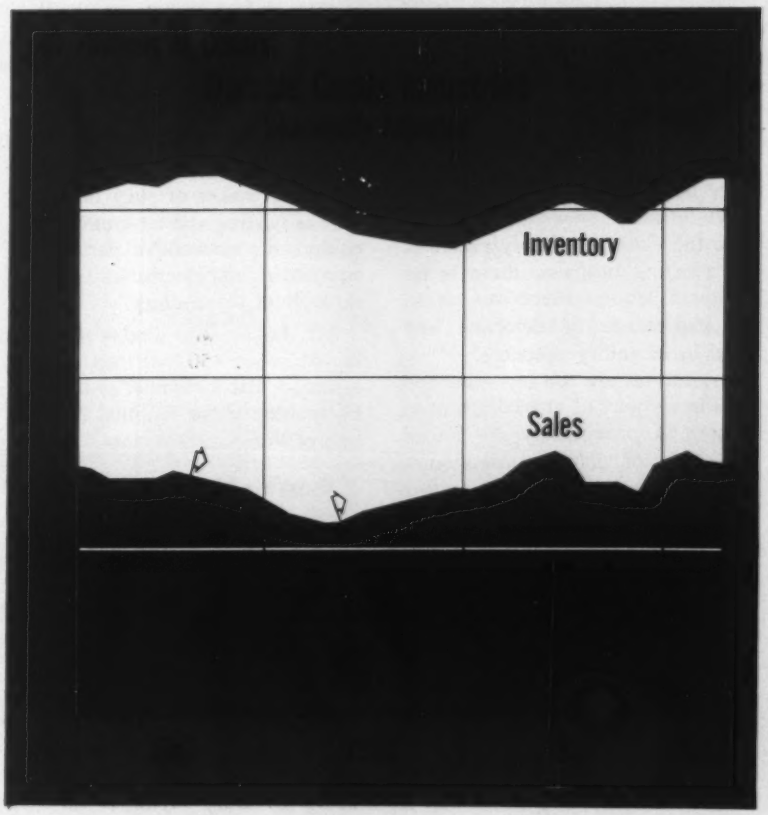
Cancellable Contracts—On the opposite hand, a heavy amount of contract buying is being done. This might be helpful, say those who worry about inventory practices, but an increasing number of purchase contracts have built-in cancellable features. This leads to costly production uncertainties and obsoleted inventories in semi-finished and finished goods.

Backup — "Inventory backup," say many, is more than a phrase coming into popular usage. It is a practice prompted by inventory management specialists where the supplier companies are "asked" to share the inventory cost and risk with the customer. In other words, purchase orders are given to a supplier with the understanding that he carry part of the customer's inventory. This practice is often claimed to reduce working capital of firms extending the "service." It adds to the cost and risks of doing business, and is considered a business "decelerator" by some.

Computer Use—The increased use of electronic data processing in purchase-inventory operations is now the popular cause of tight inventories. Use of fast automated equipment, it is claimed, permits smaller inventories through ability to know of stock requirements quickly and to order against short lead times.

Cost Control — Another reason for tight inventories is over-concern

Inventories Follow Sales Trends



Straight Talk on Inventories

George J. Papas, V.P., purchasing and traffic, Rheem Mfg. Co.

"The fact that this buyer's market developed so suddenly from a prior period of high-volume business . . . has made inventory liquidation the order of the day. This causes the appearance that inventories, as such, are being cut to the bone. Actually, they are not. They are merely being cut to the point where they are in line with current end-product demand."

Richard W. Taylor, Asst. V.P., Cerro De Pasco Corp.

"When, in a buyer's market, a supplier agrees to carry inventory for a customer, this is really a price concession. This is true because the cost of possession to the customer is lessened. And in a situation of low demand and ample supply, price concessions are in order."

William A. Ehresman, director of purchases, the Budd Company

"Buyers deserve a big share of the credit for improvements in price, quality and service. Intelligent purchasing is responsible for better products and keener competition among suppliers. Our buying is geared to production needs. We maintain a four-wall inventory, including all material in stock or in process. The amount stocked depends on the monthly production run of the item. As a general average, we try to stock 125 pct of each month's requirements."

of some managements with conservation of working capital and cost control. This leads to minimum inventory positions that are less than safe, and that interfere with a normally-expected purchase order flow.

While there may be arguments as to the extent inventory practices are affecting business, there is no argument among executives as to the importance of detecting any trend in inventory practices.

Inventories are too big—and too volatile—a part of any company to ignore. Approximately 30 pct of the assets of manufacturing companies are in inventories, according to the National Industrial Conference Board. Currently, the value of inventories of U. S. manufacturing companies runs about $50 billion. Durable goods industries account for about $31 billion of this amount.

Expert's View—George J. Papas, vice president purchasing and traffic for Rheem Manufacturing Co., is one executive who has found it necessary to study closely trends in inventories. Because of Rheem's diversification, Mr. Papas' approach has been one that crosses industry lines. He is in charge of all buying and inventory control for Rheem, a leading maker of steel drums as well as heating and air-conditioning equipment, automotive parts, farm equipment, and electronics in plants throughout the country.

Mr. Papas, who directs the buying of about 350,000 tons of steel a year, is also a member of the Steel Committee of the National Association of Purchasing Agents.

Buyer's Market — Says Mr. Papas: "The present inventory situation is due chiefly to the existence of a buyer's market—and certainly not the cause of the buyer's market."

In agreement with Mr. Papas is W. H. Roy, administrator, inventory management, for Rheem.

A second point in the analysis by Mr. Papas and Mr. Roy is that the acute inventory situation will exist as long as the buyer's market exists, and no longer. Mr. Papas sees this as a three-year pull.

Long-Range Trend — Thirdly, these executives believe there is—over-riding the temporary economic force—a long-range trend to closer inventory control. They see this as due to increased top management attention to inventories, and to more scientific inventory control methods and procedures.

But this latter trend, they say, has been going on since World War II, and its course reflects industry's general cost-reduction drive.

Observes Mr. Papas: "The fact that this buyer's market developed so suddenly from a prior period of high-volume business, and after heavy post-steel strike stock replenishment, has made inventory liquidation the order of the day. This causes the appearance that inventories, as such, are being cut to the bone. Actually, they are not. They are being cut to the point where they are in line with current end-product demand." (See chart, p. 81).

Actually, the latest inventory-sales pattern shown on the chart is a broad one. Inventories, in the face of precedence, are not now as tight as popularly believed.

Rheem's own inventory - sales ratios have not varied substantially since 1957.

Availability—"Availability" and "excess capacity" are key terms used by Mr. Roy in explaining the close buying that results in tight inventories.

"Because of excess capacity in practically all lines," says Mr. Roy, "practically everything is quickly available. And there is little anticipation of price rises. So, in the face of uncertain business, buyers see no reason to stock heavily."

When asked about inventory backup, Mr. Roy contends, first of all, that this is not a new development. Buyers started insisting suppliers carry inventory for them during the 1957-58 recession. Backup

is seen by him as a service concession prompted by competitive necessity. He feels the practice is more limited than popularly believed.

Mr. Roy discounts the impact of computerized purchasing and stock control in creating current tight inventories. Rheem does not have a computerized set-up, but Mr. Roy feels the company has the same size inventories as they would have under any other system considering the sudden business reversal.

Other Views—Two other executives with a special viewing platform overlooking the inventory situation are Cerro De Pasco Corp. vice president of fabricating, Richard H. Lewin, and his assistant, Richard W. Taylor. Cerro De Pasco represents a company with a good view as a raw material supplier to industry as well as semi-finished and fabricated parts.

Both Mr. Lewin and Mr. Taylor are in substantial agreement with the Rheem executives. They say there is a long-range trend towards closer inventories as a result of general cost improvement efforts in industry, but that any tightness in the current situation is due to existence of the buyer's market.

They admit there is some inventory backup but say this is not new. This practice goes back to post-Korean War days, according to Mr. Lewin.

Mr. Taylor, until recently a purchase-inventory specialist with management consultants, McKinsey Company, pin - points inventory backup as simply a price concession. Says Mr. Taylor:

Price Concession—"When, in a buyer's market, a supplier agrees to carry inventory for a customer, this is really a price concession. This is true because the cost of possession to the customer is lessened. And in a situation of low demand and ample supply, price concessions are in order."

Mr. Taylor adds that the inventory backup, like all price concessions, will evaporate when the market firms up.

Vacuum Melt Gives Ultra-Pure Silicon

■ A technician at the Electronic Chemicals Div., Merck & Co., Inc., carefully places an ordinary ingot or "stick" of silicon in a vertical position between two chucks. Then he seals the chamber, turns on his machine, and when the operation is completed the silicon has an impurity of only one part in ten billion.

The new Merck approach to floating zone refining means that industry can buy much purer silicon, and pay less for it.

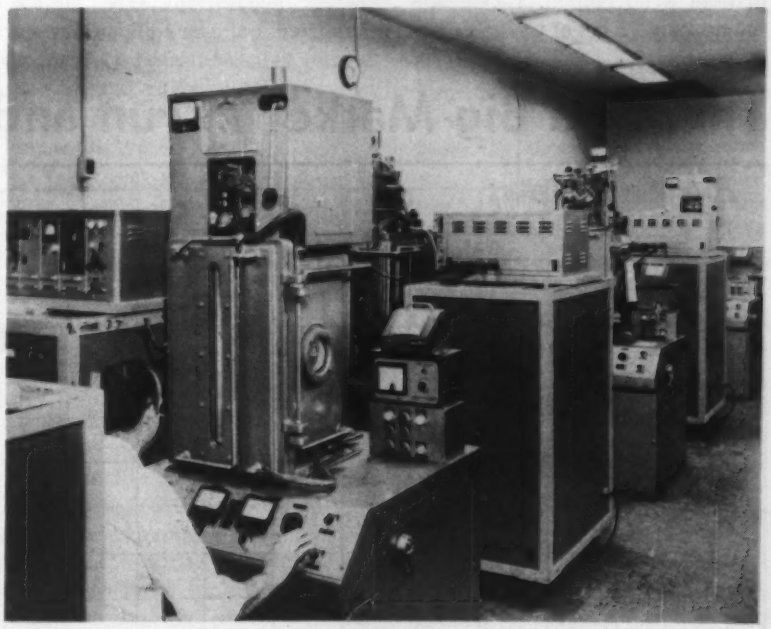
The principal demand for ultra-pure silicon is for use in transistors and capacitors. This market has been growing sharply. Also, ultra-pure silicon opens up possibilities for the conversion of solar energy into electrical energy, and as infra-red windows in infra-red sensing devices.

Purity Vital—Why silicon? It is known as the best semi-conductor for devices which must operate at high ambient temperatures, and which must have high power-handling capabilities. But its performance depends on absolute control of impurities.

Industry's approach is to purify the silicon as much as possible, then carefully add the desired impurity. Because of the high degree of purity needed, and silicon's strong tendency to react with elements in a crucible, ordinary techniques of melting and purification just won't work.

Induction Heating Used—Merck melts the silicon suspended between two checks in a vacuum.

A narrow zone of the silicon ingot is melted by induction heating.



ULTRA-HIGH VACUUM: In vacuum chambers built by F. J. Stokes Corp., Merck & Co. used induction heating to get silicon with impurity content as low as only one part in ten billion.

Leisure Goods Market Grows

The booming market for leisure time goods is attracting more manufacturers.

Of the $40 billion spent each year for leisure, about half goes for products in which metals or metalworking have a part.—By K. W. Bennett.

▪ Ekco Products Co. last week embarked on the storm-tossed leisure time market. The veteran Chicago metalworker acquired Sila-Flex, West Coast maker of higher-priced fishing rods.

Ekco vice president Don Burns told The IRON AGE, "This is our first bid for the 'Leisure-Hour Dollar.' We've spent four years studying the leisure time market. It's possible we'll go as far as acquiring three or four other firms during 1960."

Four Billion Plus—Sila-Flex will gross $1 million this year. U. S. fishermen will spend $234 million for tackle this year, and the figure may hit $250 million. Tackle represents only 12 pct of total expenditures by fishing enthusiasts.

Ekco's move points up the high interest in playtime products. Americans will spend $40 billion-plus for fun in 1960. At least $20 billion of it will go for tourism. This can range from camping on the outskirts of town to going after an elephant in Tanganyika ($900 for two weeks, which includes 15 servants and a white hunter).

The remaining $20 billion is strictly in metalworking's area.

Big, But Rough — The leisure market is big and getting bigger. A conservative estimate suggests there are already 900 manufacturing firms making sporting goods. This could be conservative. Other reports list 200 "major" fishing tackle manufacturers, and 225 producers of water skis alone. All are faced with rapid product obsolescence, heavy new product research bills, and a constant search for means of reducing manufacturing costs.

Market researchers believe the hottest market prospects, for the short run, are gym equipment, winter sports equipment, tents, and boats. But bowling, hunting and fishing, skin diving, swimming pools, outboard motors, trailers, electronic, and photographic equipment have excellent long-range sales prospects.

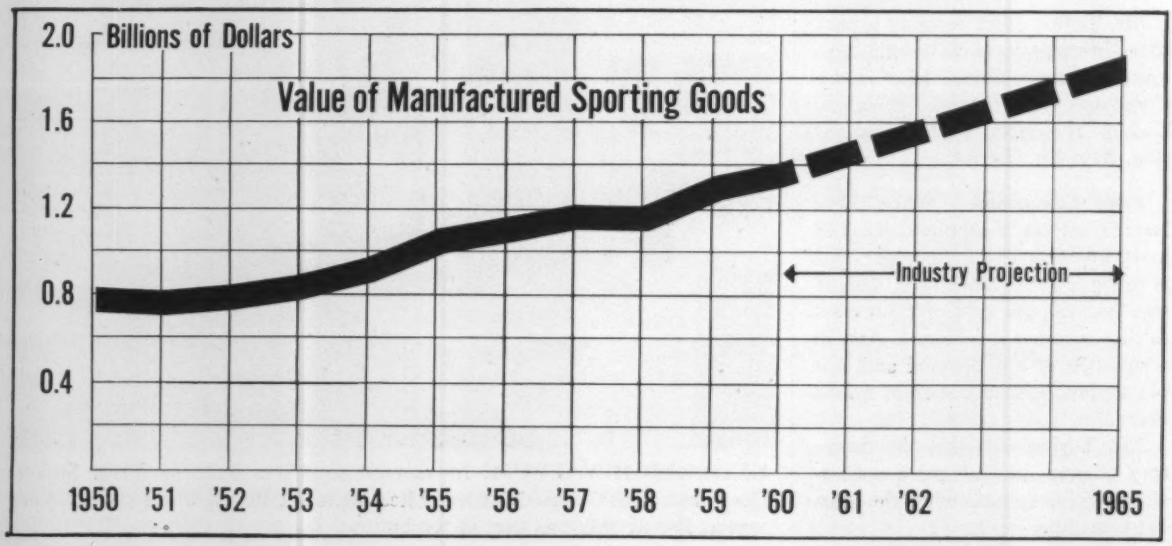
Estimates of how much money is spent on fun vary widely. This week, one major hunting and fishing magazine will announce an estimated $12 billion is spent annually in these sports. Other sources are equally positive the figure is only $3 billion.

Take to the Water—Boat users will spend over $2.5 billion this year, and purchases, even with a mild recession, are expected to run 7 pct above the record in 1959. Homelite Div., Textron, Inc., will enter the outboard motor field.

Johnson Motors Div., Outboard Marine Corp., built its 2 millionth motor last year. This year it will include a 75 hp model in its line.

If the horsepower race is dead in auto manufacturing, it's at white heat in boating. The horsepower average was 20.7 in 1958, hit 23.7

There's a Big Market in Fun and Games



last year, will rise again in 1960. The big motors use more materials and sell for more dollars. In 1959, outboard motor sales hit 540,000; the number of boats rose to 470,000.

Total sporting goods sales advanced 8.6 pct in 1959. Estimates for 1960 range from 5 to 11 pct. A Brunswick Corp. spokesman comments, "The middle income group is earning more dollars. They're spending them on leisure time items."

How to Succeed—The formula for success in the leisure market appears to be:

Acquiring an existing sporting goods manufacturing company.

An alert management that has cash reserves for increased promotion, and a lot of new product research.

Staying out of the low-cost, high volume side of the market, where competition is stiffest.

Successes aren't hard to find, and most follow this formula. Brunswick Corp. acquired, in rapid succession—Owens Yacht, McGregor Sporting Goods, Redhead Corp.; and is acquiring Union Hardware.

A Brunswick spokesman commented last week, "At the moment, our backlog of orders for pinsetting equipment (for bowling alleys) is at record levels and 25 pct over last year. Our Owens Yacht Div.'s sales are 30 pct over last year."

Branching Out—American Machine & Foundry Co. (AMF) began with bowling equipment, now builds a product line ranging from tricycles to skin diving equipment.

The electronics industry is going leisure time. Hallicrafters Co. reports that its sales of ham radio equipment were at record levels in 1959, and 1960 sales are 12 pct over the 1959 period.

Raytheon Co. is marketing a $125 electronic depth gage for fishermen.

Chance - Vought Aircraft, Inc. has purchased three firms with 14 plants, plans to enter the house trailer market. U. S. travelers purchased a record $636 million worth of trailers in 1959.

Wage Jumps to Hit Three Product Lines

Labor Dept. hears members of structural steel, machine tool and metal business furniture industries.

They appeal previous wage minimums set by department.

▪ Increases in minimum wages paid on government contract work are in the offing for the structural steel, machine tool, and metal business furniture industries.

The minimum for workers employed in these industries will jump anywhere from 40 to 80 cents under the Walsh-Healey Public Contracts Act, which gives the Secretary of Labor authority to determine minimum wages on work done on government contracts.

Rehearing Going On—A tentative decision on minimum wages for the structural steel industry was made early in 1958 by Secretary of Labor James P. Mitchell. Industry members, however, took exception to the decision and Mitchell granted the industry a rehearing.

The rehearing is now being conducted in Washington.

The Secretary's tentative decision was a wage of not less than $1.80 an hour arrived at either on a time or incentive basis. This was the first determination made for the structural steel industry. Labor had sought a minimum of $1.88, while industry had recommended $1.50.

Single Wage Unfair—After Mitchell's tentative decision, industry representatives complained that the nationwide minimum of $1.80 was unfair in some regions of the country, that separate determinations should be made for the galvanized and nongalvanized products of the industry, and that better prevailing wage determinations are needed for special products and localities.

The Secretary agreed to give industry another opportunity to present evidence on these three points. Whether the evidence will bring a change in the decision remains to be seen.

The new decision on the structural steel minimum probably will not come until the end of the year.

Whatever the minimum wage determination it will have to be paid by anyone supplying fabricated structural steel to the government on contracts in excess of $10,000. The $10,000 limit applies to all Walsh-Healey determinations. And, in effect, these determinations become the minimum wage for the entire industry.

Metal Furniture — The decision for the metal furniture industry should be made soon.

Hearings were held in January and the unions recommended a $1.54 minimum for workers. The present rate is $1.10. During the hearings, an AFL-CIO economist claimed that a survey made by the Bureau of Labor Statistics in February of 1958 showed that the prevailing minimum in the industry was $1.52 an hour. Labor added two cents for the time lapse and came up with a minimum of $1.54.

Employers, however, said the $1.52 was unreal and did not adequately reflect the wages paid by small manufacturers who obtain government supply contracts. They also complained that the Labor Department's definition of the metal furniture industry was too broad. They argued that such items as tool boxes should be included in the tool industry.

Machine Tools—Hearings for the machine tool industry will be held after a wage survey of the industry is made. Survey questionnaires are being sent out now.

Britain Bids for More Business

Britain displays its traditions, products and engineering know-how in New York.

Exhibition has a double purpose—a gesture of friendship and boost exports.

■ British industry is spending $10 million to boost sales to the U. S.—already its largest export customer,

The British Exhibition, a trade fair and show, opened at New York's Coliseum and Madison Square Garden last week and will run through June 26.

The trade fair, financed by private industry, is the largest trade fair and show ever staged in the U. S. by a single foreign country. It occupies 400,000 sq ft of floor space in the Coliseum — double the floor space taken by the Russians last year for their science and culture exhibit.

Reciprocal Trade—Some 300 individual companies have exhibits in the show. Many are strongly laced with "consumer interest"—textiles, dinnerware, Scotch whiskey. Others are "prestige" exhibits— minting of coins, a composite English pub complete with barmaids—aimed at building goodwill in America and showing bits of English life.

But the industrial aspects of the trade fair are unmistakable. Lord Rootes, chairman of Great Britain's Dollar Export Council, points out: "Britain sells more to the U. S. than any other country, but it buys more from the U. S. than any other country."

World Traders—A British banker gives this explanation of why the trade fair is being held: "We have to fight Volkswagen." The referende is figurative as well as literal.

He explains that while the British are traditionally world traders, other countries are discovering the importance of exporting; the competition in world markets is now stiffer than it has ever been.

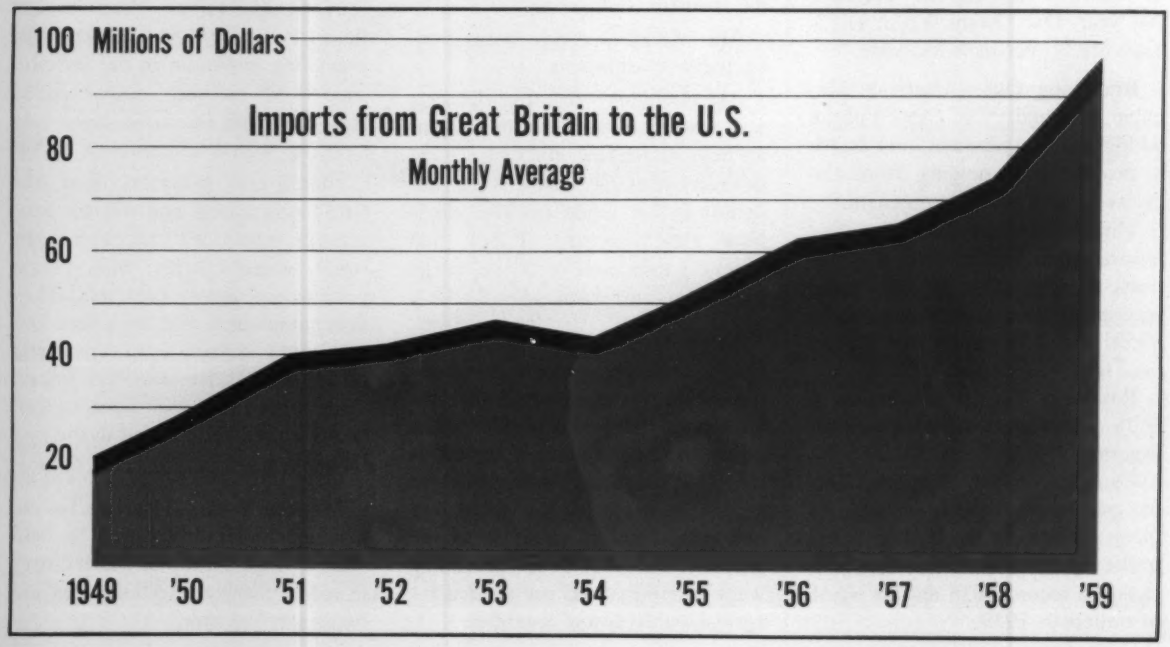
Volume Leaders — Automobiles and commercial vehicles are the leading dollar volume export to the U. S. accounting for nearly $300 million in trade last year.

But machinery leaped in second place in 1959 dropping whiskey to third place despite a $10 million increase in sales to $98 million. British manufacturers boosted machinery sales to the U. S. by a whopping $71 million in 1959 to a record $166 million. The country is the world's largest exporter of textile, hosiery and knitting machinery.

Despite the importance of automobiles as export products, the exhibits are played-down in comparison with those at the International Auto Show a month ago (The IRON AGE, May 5, p. 33). Instead, emphasis has been placed on commercial vehicles—particularly light delivery vehicles—and including a line of electric delivery trucks. However, a line of heavy trucks is being offered in the U. S. for the first time.

Two-Way Street — Other manufacturers are showing tractors, diesel engines, and automotive component

U. S. Is Best Customer for British Exports



parts. All want to sell in the U. S.

One manufacturer hopes to crack the materials handling market with a line of fork-lift trucks; it is also offering a new bearing alloy; and it's looking for customers for its line of heavy-duty truck and trailer axles.

While vehicle manufacturers want to expand present markets and open new ones, trade is a two-way street, according to Geoffrey Rootes, president of the Society of Motor Manufacturers of England.

He points out that the British motor industry has bought $50 million worth of sheet steel from America over the past three years. And in the next two years, he says, Britain will spend another $50 million on American machine tools.

Steel Exhibit — The British Iron and Steel Federation is spending $300,000 for its exhibit. However, the steelmakers don't consider the U. S. as a volume market for their products. The president of a leading British steel company explains the industry prefers to see its steel exported as "finished" products, because of the greater value.

The industry, with a 25 million ton annual capacity, exported only about 12 pct of production in semi-finished form. However, the steelmaking executive says that 50 pct of output is exported when finished products, such as automobiles, are considered.

Want to Export—However, the steel industry is in the process of expanding capacity. By 1965 it will be over 30 million tons. And present facilities are being modernized. Use of oxygen is getting close attention. One executive says that two years ago the industry used only 80,000 to 120,000 tons of bulk oxygen per year. This year it will use 1 million tons, next year it will be 2 million tons of bulk oxygen.

Rolling capacity is being increased with two new mills in the works and a third being expanded. Here the emphasis is on wide sheets, an area where the industry falls short of supplying the needs of the country's auto industry. In a few years, the steelmakers say they hope to be able to export tonnage orders of sheets and still meet domestic demands.

INDUSTRIAL TRACTORS: Massey-Ferguson is one of several tractor builders that would like to expand sales of industrial equipment in U. S.

British Tools — British machine tools—presses, lathes, drill presses —are fairly standard. But, claims one machine builder, the engineering concept is different. U. S. buyers, he says, tend to buy "bits and pieces and assemble machines themselves." The British, on the other hand, contract to build the entire machine as a unit. Only one company is responsible for the complete installation and its operation.

A manufacturer of pumps and valves, Towler Bros. (Patents) Ltd., a subsidiary of Metal Industries Ltd., intends to establish a manufacturing facility in the U. S. At present, there is a 15 pct duty on its products. But the company believes it can manufacture in the U. S. for less than its present costs plus the tariff. And it expects the U. S. company to be larger than the parent within 3 to 5 years.

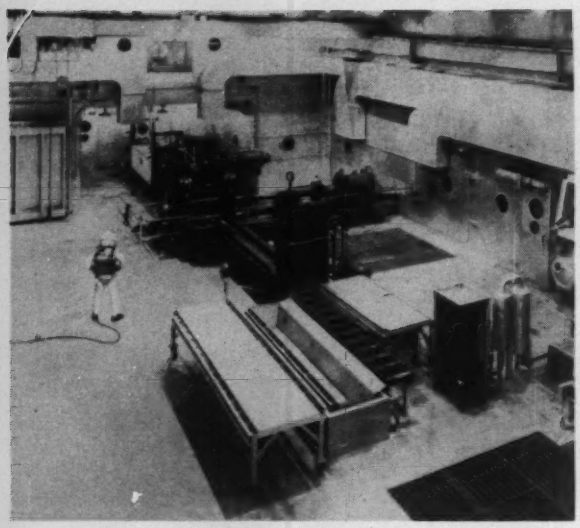
Age of Electricity — Electrical products range from television equipment and radar sets to electric motors. A xenon lamp, a little larger than an ordinary light bulb, produces 600,000 candlepower. It's designed for use in lighthouses.

Explosion-proof electric motors, built for use in chemical factories, mines and other areas, are displayed alongside vertical pump motors used for deep-well irrigation pumping.

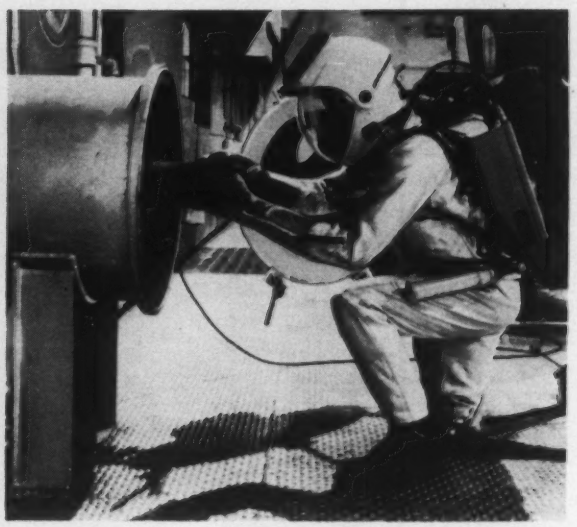
A working model of a coordinate inspecting machine is demonstrated by Ferranti, Ltd. It provides a rapid means of checking machined workpieces to 0.001 in. The machine is equipped with a direct numerical readout to reduce errors, even with inexperienced operators.

Radar and TV—Associated Electrical Industries claims its radar equipment is easier to operate than standard equipments, and offers "more tracking continuity." To offer proof, it set the scanning antenna on the roof of the Coliseum. And visitors can watch ship traffic on the Hudson and East rivers by monitoring radar scopes at the exhibit.

Another manufacturer, the Pye Group, is showing the latest in industrial television equipment. This includes: A long-nosed camera to inspect the "hot" portions of atomic installations; underwater television for use in salvage operations; and three-dimensional television.



FILLED WITH ARGON: Chamber for inert fabrication was built by Universal-Cyclops with Navy's aid.



THROUGH THE LOCK: Technician brings molybdenum ingot into plant through tube-shaped lock.

How to Hot-Work Molybdenum

Universal-Cyclops unveils new method for hot working refractory metals without atmospheric contamination.

Metals are forged and rolled in large, sealed chamber filled with argon gas.

■ The world race against time and temperature may soon force a space-age approach to metals development.

Need for this approach, along with some of the elements, was brought out last week when a new fabricating facility was unveiled by Universal-Cyclops Steel Corp. at Bridgeville, Pa.

Called "Infab" (inert fabrication), the new facility is designed for hot working molybdenum and other refractory metals. Metals are forged and rolled in a large, sealed room filled with argon gas to prevent contamination at high temperatures.

Prevents Contamination — Prime purpose of Infab is to permit thorough hot-working of refractory metals without contamination from the atmosphere. Molybdenum and other metals are highly reactive at high temperatures yet must be brought to these temperatures for good working.

Infab aims at solving this problem with gas protection in a facility elaborately and specifically equipped for handling refractory metals. The plant is reported to have cost $4 million. The Navy contributed $3 million and Universal-Cyclops the rest.

Why Needed—Behind this spending is one hard fact: Space and defense programs are rapidly moving beyond the capabilities of conventional metals and conventional production. The hottest metals now commonly used go out of the picture at about 2000°F. For reentry, sustained flight, electrical propulsion, and other applications, planners are now calling for materials that will take temperatures from 2000°F up to 6000°F.

In these upper regions, refractory metals offer the most promise. For some applications, the need to put these metals in usable form is already past due.

"No problem has been more frustrating in rocket design than the limits imposed by materials," says Dr. Verner R. Kirchner, head of the Polaris missile program for Aerojet-General Corp.

The U-C Method—For Infab, a GE consumable electrode vacuum furnace supplies ingots. It will produce one in molybdenum up to 12-in. across by 80 in. long and weighing 3000 lb.

With Infab, ingots can be heated to 4500°F, then forged into billets or sheet bars on a Chambersburg Impactor. These can be rolled to bars or sheets on a 16-in. two-high Birdsboro mill. An Air Products unit supplies the argon atmosphere. There's room in Infab for welding and hot machining, if desired.

Rapid Change — Mr. Kirchner indicates rocket design is heading toward temperatures beyond the limits of most refractory metals.

Aluminum Pours Into New Homes

Urban Renewal Projects Open a Big New Market

Reynolds Metals Co. will soon start building 10,000 new homes in a Philadelphia urban renewal project.

It will mean a new market for aluminum and will help acquaint more people with its variety of uses.—By M. J. Tatich.

■ Within the next 10 years a new community housing 60,000 people will be built in an area that was once one of Philadelphia's blighted eye-sores.

Into the city within a city will go tons of aluminum to be used in homes, schools, apartments and industrial plants. It is the largest urban renewal project ever undertaken in the United States.

New and Old—Reynolds Metals Co., with two Philadelphia builders, S. A. and H. A. Berger, will build 10,000 homes and apartments, and an industrial park in the old Eastwick section of the city.

What's behind Reynold's great interest in urban renewal? Albert M. Cole, executive vice president, Reynolds Aluminum Service Corp., says the firm will make a profit on both the huge amount of aluminum used and on the sale of the completed buildings.

Keep Tradition — Philadelphia buildings are traditionally brick and stone. And the new building will be built similarly, says Mr. Cole. But aluminum will be used for insulation, windows and doors, trim, gutters, hardware, floor underlay and many other uses. "And in 10,000 homes this can add up to a lot of aluminum," says Mr. Cole.

Reynolds estimates that between 36 and 52 million lb of aluminum will be used in the Philadelphia project and four smaller ones in Washington, D. C., Kansas City, Mo., Kansas City, Kan., and Cincinnati.

Fast Capital Return—However, it is probable that aluminum produced by companies other than Reynolds will be used in the four-square-mile project. Mr. Cole says all work will be done on a bid basis and if others underbid Reynolds' users they will get the job.

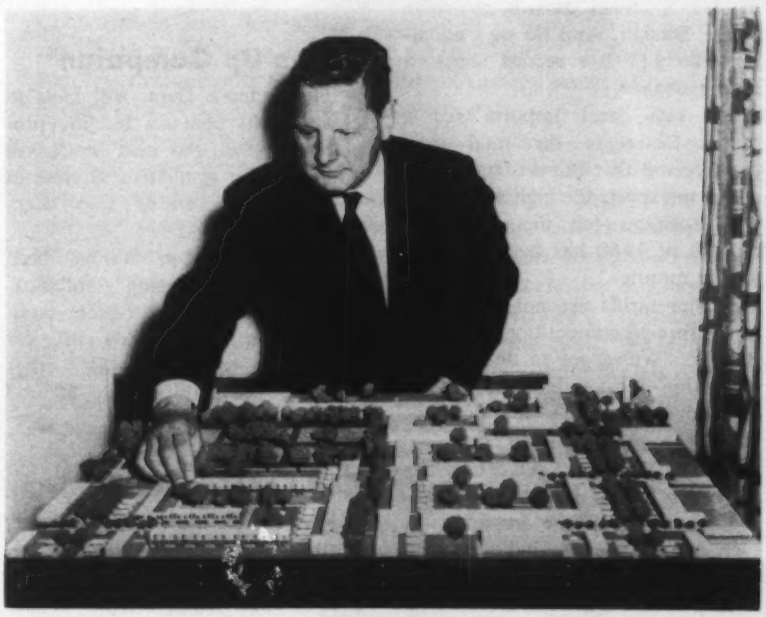
Reynolds' allocation for the project totals $750,000. To guarantee a fast turnover of capital, the homes will be constructed in groups. As soon as a group is completed the homes will be sold through brokers. Prices for most homes will range from $11,000 to $18,000. The largest share will cost from $12,500 to $13,500. A very few will be priced as high as $35,000.

The Main Purpose — Mr. Cole says it can't yet be determined where the profit will be greater, either from aluminum sales or from the finished homes. "We may use more aluminum in homes built toward the end of the project than those built in the beginning. It all depends on how things work out."

"Our main purpose is not to go into the development business," Mr. Cole stresses. "We see this as a means of familiarizing more people with the many uses of aluminum—particularly the housewife who will see aluminum all around her in her new home."

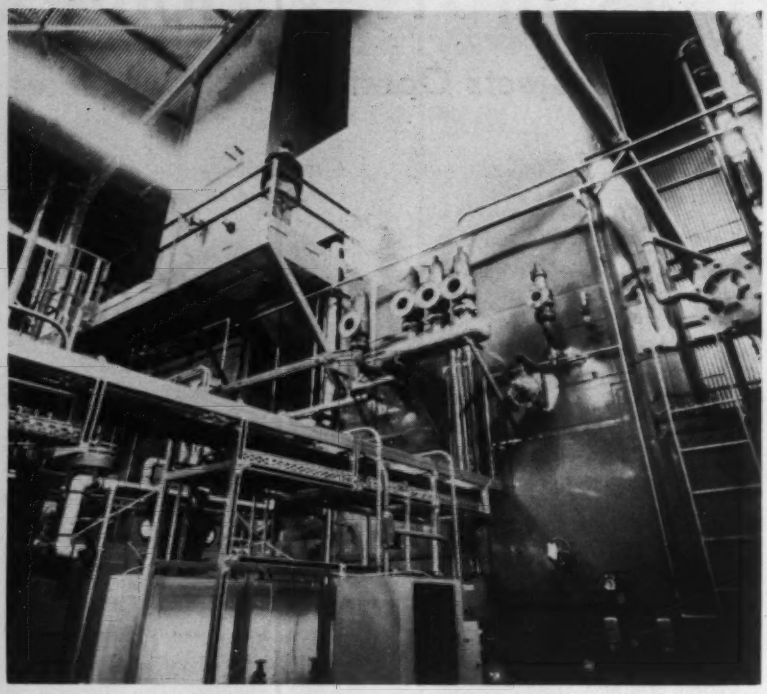
New Corporation—A new firm, New Eastwick Corp., will be formed by Reynolds, the Berger brothers and possibly other parties. It will be dissolved after the project is completed. The corporation will call on local contractors, labor and architects.

Mr. Cole says Reynolds now has plans for "a couple" more renewal projects and one that will call for building more luxury type houses.



GOING UP: Reynolds' Albert M. Cole looks over a model of a portion of the Eastwick urban renewal project scheduled to get underway soon.

Oxygen Flows for Steelmaking



UNDERWAY: Air Reduction Sales Co. has just opened this new liquid air separation plant at Butler, Pa. It will serve the Butler Works of Armco Steel Corp. with pipeline oxygen.

No Record Coming

The steel industry has little chance for a 120 ton year according to U. S. Steel board chairman Roger Blough. And he says equalling the 117 ton record seems a fading chance.

He says steel imports are a minus factor in the total steel picture, and that imports have held at an unexpectedly high level. Import tonnage for the first four months of 1960 has been 500,000 tons a month.

Higher tariffs are not a solution to the foreign competition, says Mr. Blough. "We've got to do a better marketing job, and we've got to develop a completely new point of view."

On the brighter side, he says the order fall-off is bottoming out. A pickup should be apparent as early as August, he indicates. He believes customers are using up steel at a rate that corresponds to a 70 to 75 pct operating rate for the steel industry.

Mr. Blough says there is no intent to raise steel prices at the present time. The future is uncertain, he says.

Clean Up Campaign

The Defense Dept. will have to clean up its contract bidding procedures before the next session of Congress if it wants to stay clear of congressional action, says Rep. Charles A. Vanik.

The Department has been charged with "rigging" specifications in bids so that certain companies can be "figured in" for defense production while other capable competition is "figured out."

Cut Foreign Aid?

Renewal of the cold war is being misused as an excuse to step up U. S. foreign aid, according to Chairman Walter Harnischfeger of the Citizens' Foreign Aid Committee.

Foreign aid should be sharply reduced, the committee believes, with the extra money going into a build-up of U. S. defenses.

Mr. Harnischfeger charges the Eisenhower Administration with "blacking-out any request for a material step-up in appropriations for our own national defense."

Specifically, the Committee wants foreign aid funds spent to strengthen the Strategic Air Command (SAC), to reactivate the B-70 (bomber) procurement program, and step up procurement of the Polaris (sub-fired missile) program.

Steel Exports Up

Exports of steel mill products continued upward in April, while imports dropped sharply, the Iron and Steel Div., Business and Defense Services Administration, reports.

April exports rose to 235,000 tons, 39,000 tons higher than the same month in 1959. The figure represents the best export trade since October 1958.

Cold-rolled sheets, tinplate and rails accounted for most of the increase.

Imports in April were 331,000 tons. This is a drop of 133,000 tons below March figures and 28,000 tons below April 1959.

Speed Hearings

National Labor Relations Board Trial Examiners conducted a record 100 hearings of unfair labor practice cases in May.

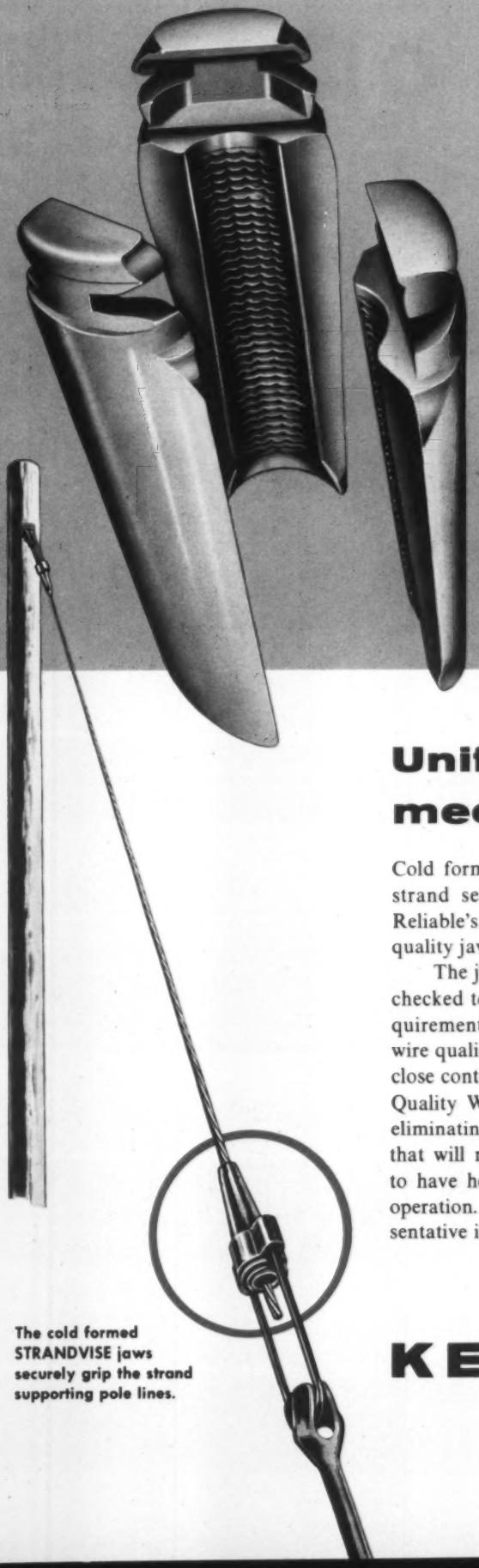
A one-third reduction in the number of docketed cases awaiting hearing has been made since the end of 1959, the Board says. Pending cases have been cut to 216 from 340. During the first five months of this year the Trial Examiners conducted 412 hearings. This was the greatest number for any similar period in NLRB's 25-year history.

Along with the larger number of cases now being heard is a shortening of the period between issuance of unfair practice complaints by the General Counsel of the NLRB and the close of hearings.

10 STAGE COLD FORGING

KEYSTONE FORGING WIRE WIRE STUDY

Reliable ELECTRIC COMPANY
Franklin Park, Illinois



The cold formed STRANDVISE jaws securely grip the strand supporting pole lines.

Uniform KEYSTONE WIRE meets the demand . . .

Cold formed jaws that clamp together in a "death grip" hold the strand securely when tension is applied — this is the secret of Reliable's remarkable STRANDVISE®. And the secret of producing quality jaws successfully is Keystone Wire!

The jaws are formed in ten cold forging steps — finish is micro-checked to a tolerance of ±.0015 on smallest chucks. Such rigid requirements challenged Keystone metallurgists to combine the right wire qualities — flowability for extreme forming, uniform temper and close control of diameter on a wide range of sizes. Keystone Forging Quality Wire continuously performs this intricate die forming job, eliminating rejects and waste previously experienced . . . making jaws that will not fail — sharp teeth that bite in and hold. We're proud to have helped Reliable find the solution to a complicated forging operation. We'll be glad to help you, too! Invite your Keystone representative in today for a discussion of your wire problems.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

Quantity
PRODUCTION
of
GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

*

ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

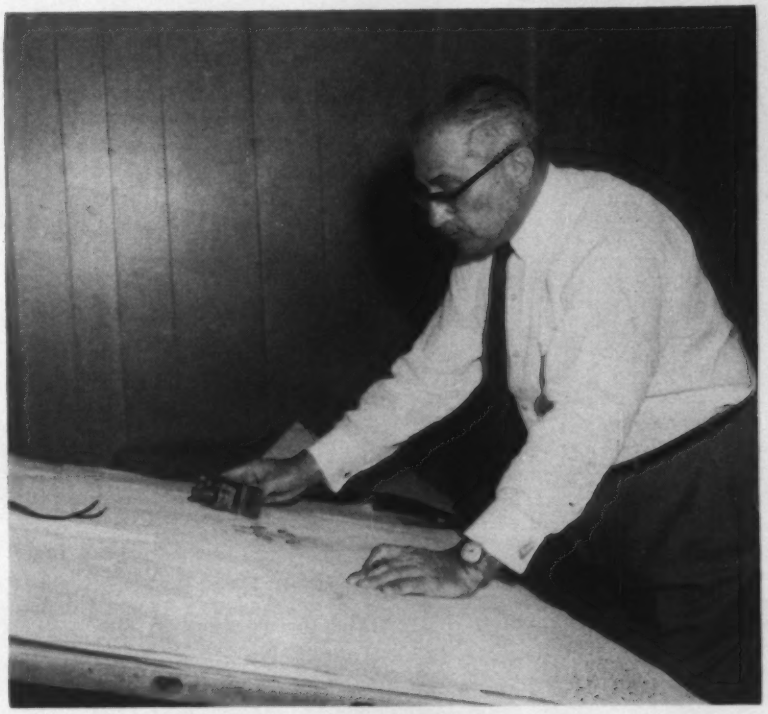
CHATTANOOGA 2, TENNESSEE

Fred G. Burg

He Runs an Active Business

Fred G. Burg started his business with a one man shop on the West Coast.

Today his company is a leader in the turret drilling machine field.



FRED G. BURG: He is constantly on the go.

■ Fred Burg began his metalworking career by opening a one man shop in California in 1943. His first, and that time only product was a full floating tool holder. Today his firm, the Burg Tool Manufacturing Co., is one of the world's largest builders of turret drilling machines.

When Mr. Burg completed his tool holder he turned to designing the turret drill. By 1947 the first finished drill was shipped out of the plant.

Hard at Work—Mr. Burg is a man of tremendous drive. While at work he spares neither himself nor his associates as he expects the same from anyone working with him as he puts in himself.

Mr. Burg is very active in every phase of operation of his firm. At one minute you will see him in the shop explaining how to run a part and the next you find him in the engineering department going over a host of new plans or putting into operation some new machine or tool that he has developed.

Optimism Plus—Mr. Burg is constantly at work designing new products. And he is very optimistic in regard to his ideas. In fact, he is willing to back them up by making the machine, regardless of its cost and without an order.

He is constantly a part of the management team and holds meetings with his associates on all phases of the business. At the end of 1959 he held a sales conference bringing in all his direct men to plan the company's 1960 sales campaign.

On the Road—He also likes to take sales trips and travels a great deal working with his men to assist them in getting new orders. In 1958 he made a trip to Europe which ended up with the establishment of an overseas licenseship.

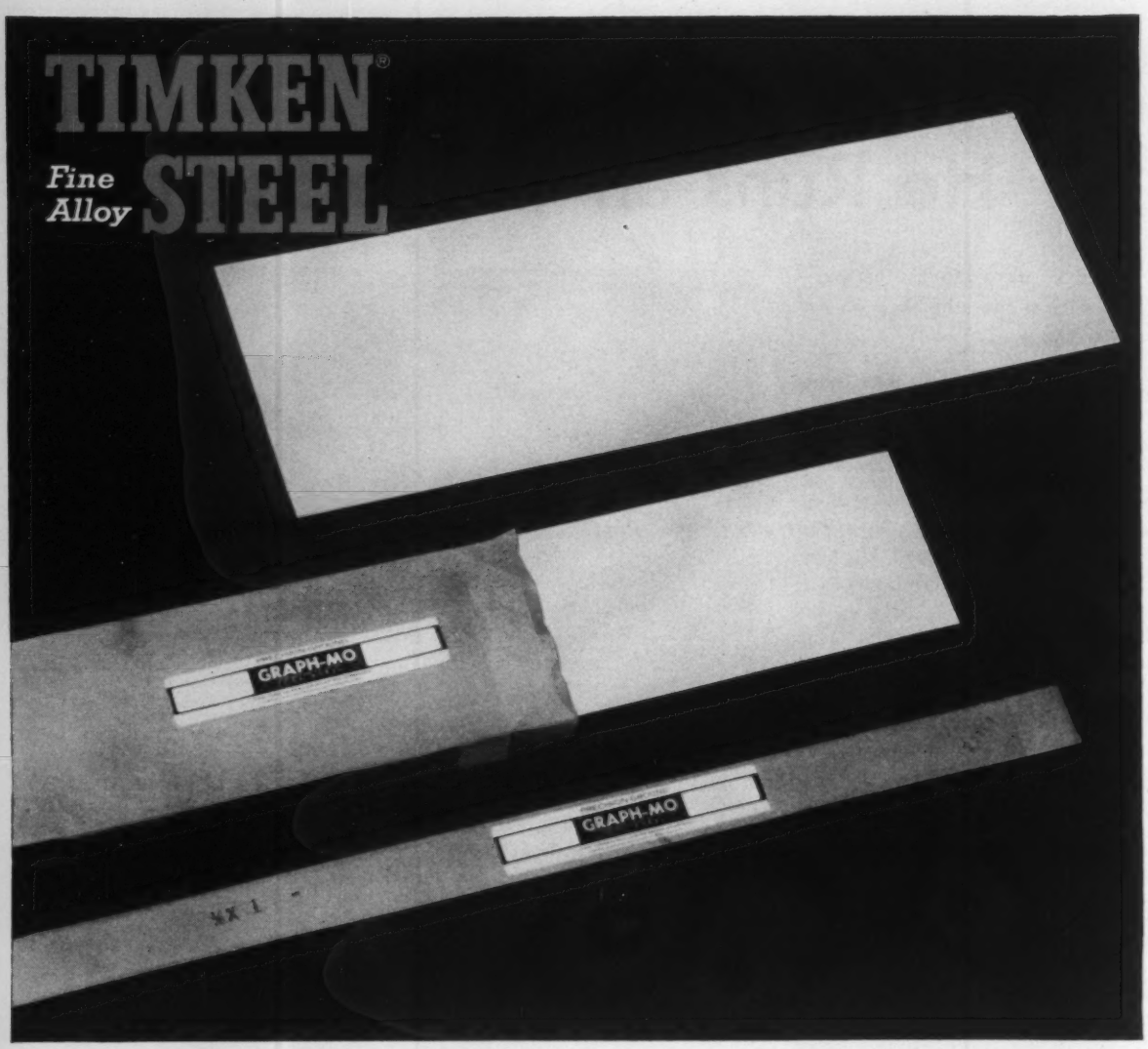
One of the main reasons for the success of Mr. Burg's company is an excellent sales policy. He believes whole-heartedly in standing behind his product, and will extend service at the company's expense to back up a Burg-made tool or machine.

Mr. Burg's basic business philosophy is, "If you want to milk a cow, you have to feed it first. The more you feed it, the more you can milk it." And this explains his drive and energy in the business.

His hours in the plant are never "by the clock," and his average work day starts at 7:30 in the morning and ends at about 3:30 in the afternoon. But Mr. Burg never leaves the plant behind.

When working with his associates Mr. Burg is always ready to listen to any reason for any action going to be taken. If he agrees with it, or with the basic philosophy of it, he will go along with it.

Although his business is by far the most demanding part of his life, Mr. Burg admits he has one outlet. That's taking his rod and reel and getting away to where the fish are running.



How tool steel users save 5 ways with precision ground flats of GRAPH-MO®

Now you can have all the advantages of high-quality graphitic tool steel in a new, convenient form. Specify Graph-Mo® in precision ground flats and save because:

1. **GRAPH-MO OUTWEARS** ordinary tool steels 3 to 1 because of free graphite particles and diamond hard carbides in its structure.
2. **SEMI-FINISHED** precision ground flats save you time and money by eliminating some preliminary operations.
3. **30% EASIER MACHINING** saves you still more when you specify Graph-Mo.
4. **GRAPH-MO'S HEAT TREATING** response is uniform, eliminates distortion in preparation.
5. **SPECIAL PROTECTIVE WRAPPING** assures top condition when you get ready to use your Graph-Mo precision ground flats.

There is only one Graph-Mo and the Timken Company makes it. Graph-Mo precision ground flats are available in 250 different sizes to give you maximum savings. Get your stock list from your local Timken steel distributor or write direct to: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*

TIMKEN GRAPHITIC STEELS ARE AVAILABLE FROM STEEL SERVICE CENTERS IN 40 CITIES IN THE UNITED STATES AND CANADA

What to Expect in Second Half

As the first half ends, 1960 hasn't lived up to advance predictions.

During the second part of the year, the pattern won't change too much. But there are grounds for some optimism.

■ In two more weeks the first half of 1960 comes to a close.

In many ways, the six months period was a disappointment. Business failed to get the soaring sixties off to a fast start.

With the coming of spring, there was some scattered improvement. But doubts about the rest of '60 are plentiful. What can you expect for your business in the second half?

No Drastic Change—Conflicting trends make accurate analysis difficult. But, based on what's happened so far, the best guess is this: More of the same. Most of the factors that kept the boom bashful won't change drastically. On the other hand, they shouldn't weaken substantially.

Here's the probable course of some major business indicators:

Production — Industrial output hasn't declined, despite inventory reduction. The Federal Reserve Board's production index (seasonally adjusted) was 109 this April, compared with 107 last April. And it's only 2 points below the 111 of January, 1960. If consumer buying and capital spending hold up, output should stay high through the rest of '60.

Inventories—Reduction of stocks has been given a major share of the blame for the business turndown. There's doubt this is the case. Present low inventories are the result, not the cause, of the buyer's market. (See Special Report, p. 81.) After the expected summer slump, manufacturers inventories should increase, led by automotive steel buying for 1961 model runs.

Consumer Buying—So far in the 1960s the consumer's attitude has been remarkably stable. It has not been shaken too much by business pessimism, international developments, or tight money. And in the months ahead, the prospect of easier credit (see Washington, p. 101) should encourage buying.

Capital Spending — Outlays for new plants and equipment should stay reasonably strong during the rest of '60. Third quarter spending, according to the latest survey of the Dept. of Commerce and the Securities and Exchange Commission, won't rise much above second quarter levels.

Spending in the first quarter of '60 (seasonally adjusted) was at the annual rate of $35 billion, says the SEC. Business will invest at a $37 billion annual rate in the second quarter and $37.5 billion in the third, the survey notes. Manufacturers' investment in the third quarter should reach a rate of over $15 billion, about 25 pct higher than the same period last year.

. . . . And During the 1960s

■ The business problems of the past few months will continue troublesome into the 1960's. But economists and Wallstreeters still expect a "moderate" boom for the period.

These were some conclusions from an Elmo Roper and Associates survey of members of the New York Stock Exchange and economics professors.

The majority in each group predicted "relative economic stability" or the "moderate boom." Only 3 pct of the Wallstreeters and 1 pct of the economists looked for a "huge boom."

Major Worries — The negative factors singled out include inflation, labor union policy, and foreign competition. Both groups believe economic growth in the 60s is possible without inflation.

An unbalanced Federal budget is not always regarded as a bad idea. It should sometimes be used to stabilize the economy during a recession or depression according to 69 pct of the Wallstreeters and 96 pct of the economists.

Profits Improved In First Quarter

After-tax profits of most major groups of U. S. industries were up slightly in the first quarter over the same quarter of '59.

Profits for first quarter '60 are estimated at $4.0 billion, compared with $3.8 billion in first quarter '59, according to SEC reports.

The return in terms of dollars per sales was the same as a year ago, 4.7 cents.

Your new Udylite rectifier is

FULL LOAD TESTED

before it leaves our plant

At the Udylite Load Bank Test Center your new rectifier must pass the most rigorous of inspections before you're even allowed to place it in service. *Every* Udylite rectifier must pass these tests—being made to meet highest product-in-performance standards at *Full Load Capacity*. The tests, run on specially developed equipment, minimize the element of human error and guarantee you finest possible manufacture. Here's what you can count on:

- ★ absolute soundness . . . freedom from defective components.
- ★ elimination of performance standards guesswork by Full Load Test.
- ★ your unit fully checked out . . . ready to hook up and go to work.

world's largest plating supplier

udylite

To gain this truly comforting assurance choose Udylite Rectifiers, the finest electrical equipment, designed expressly for the plating industry by Udylite. Check with your Udylite man or write to:

the udylite corporation

detroit 11, michigan

on the west coast: L. H. Butcher Co.

Slide Rule Yields to Computers

Ford Engineer Cites Time and Cash Savings

Computers are getting more and more of the tough automotive calculations.

Typical example shows how time and money are saved by the computer.—By A. E. Fleming.

■ It no longer pays to give an automotive engineer a pencil, paper and slide rule for solving complex equations. Not with a computer around.

H. S. Setz, of Ford Motor Co.'s engineering and research staff, cast a new light on the man vs. machine debate at the summer meeting of the Society of Automotive Engineers in Chicago last week.

It Pays Off—He showed the engineers how at Ford a computer is more than worth its weight in dollars and cents.

The problem he illustrated was to figure out how a car performs before it is even produced. It's something every car maker tries to determine as accurately as possible.

Cost Comparisons—At Ford, it took seven minutes and cost $4 for a computer to predict the acceleration performance of a car with automatic transmission; three minutes and $2 to make a prediction on a manual transmission car.

By hand calculation, it took 240 minutes at a cost of $30 for the automatic transmission car; 180 minutes and $22.50 for the manual car. And the hand-calculated predictions were slightly less accurate.

Use Grows—With this evidence, it's not hard to see why the use of computers in the auto industry is rising. At Ford, the use of the computer as a predicting device has increased since its introduction. In 1957, only 853 predictions were made. In 1958, the number rose to 1853 and dropped to 1580 in 1959.

But this year, 1104 predictions by computer were made in the first quarter alone, with some 2660 looked for in the entire year.

Fabric Makers Have Their Problems

One speaker at the SAE meeting who received some sympathetic attention was a textile man who related the problems of the suppliers of automotive woven fabrics.

The big problem, according to R. T. Chatham, Jr., of Chatham Manufacturing Co., Elkin, N. C., arises because automobile designers are setting new and tighter standards on interior fabrics. They want nylon, rayon, acetate, wool, and cotton that will provide longer lasting upholstery materials. They want more colorful fabrics with better non-fade characteristics.

More Research—It boils down to increasing research for textile makers, whose profressional know-how

New Comet Stationwagon Hits the Highway

SO BIG: The new Mercury Comet compact station wagon seats six and has a cargo capacity of 76.2 cu ft. With tailgate closed it has more than 81 in. of floor space. It comes in two- and four-door models.

and imagination are being taxed as never before.

Standards are a major challenge. Each car maker has its own set of requirements. "Meeting these standards has been made more difficult by the desire of styling departments to get new effects in fabrics," Mr. Chatham says. "Because of this, the development of the average automobile fabric takes from three to six months, even longer."

New Model Problems—Magnifying the situation is the wide variety of cars and body colors offered by individual producers. An added burden is the trend toward bringing out new or slightly altered models in the middle of a model year, in some cases months after the formal introduction.

The rough task of developing new fabrics and designs is a costly part of the business. Nevertheless, new ways to make and dye fabrics are developed constantly.

More Fabrics — Indicating the swift advances is the fact that more new fabrics cropped up in the past 10 years than in the previous half-century. There is the case of nylon, one of the auto industry's most popular and useful fibers. One type was available eight years ago. Now, there are at least six.

There are nylons for producing strip effects, others for creating dull, semi-dull, bright, lustrous, or sparkling finishes.

One basic kind of fabric construction has been found to meet most demands. This is a nylon filament warp, with spun filling yarns of rayon or cotton, and mixtures of these types.

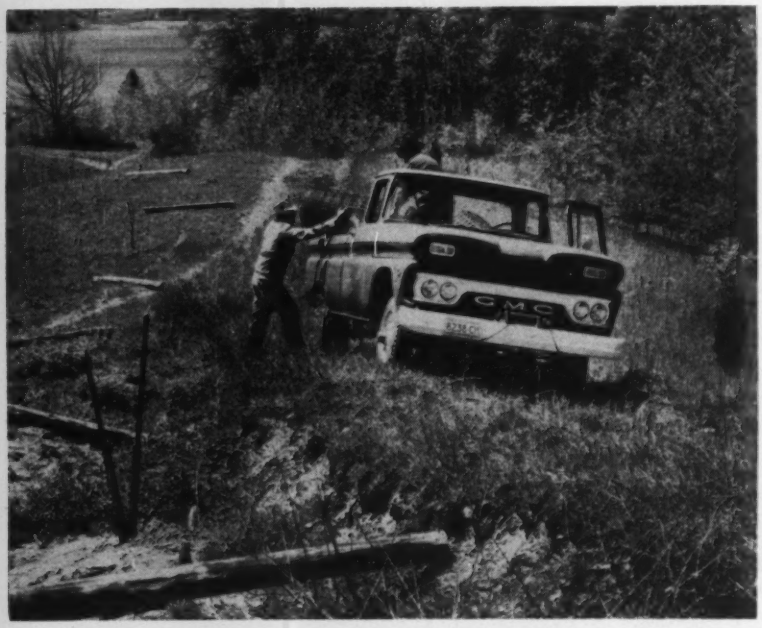
The automotive fabrics are subjected to severe tests. Here are some, as outlined by Mr. Chatham:

Abrasion—The wearing ability of a fabric is probably its most important asset. This requirement limits the production of new types and textures more than any other. Fibers such as viscose and acetate, which could become more highly-styled fabrics in many cases, can't be used because of poorer abrasion resistance compared with nylon.

Crocking—This is done by rubbing a piece of white cloth against a fabric to see if any color comes off. If crocking occurs, the fabric is coated with some type of silicone or resin solution. If this doesn't work, it may become necessary to work out a new shade.

Fading—With more glass in today's cars, the ability of a fabric to fight the fading effect of sunlight is becoming more of a problem. Most fabrics made with the best dyes are meeting minimum fading requirements. But there are shades which can't pass the test. In any color, it's hard to dye a light shade which won't fade. Any blue shade and red on most fibers has poor light fastness. There are some fabrics which solve the fade problem entirely, but they don't wear as well.

For Use in Rugged Terrain



ROUGH GOING: But this new GMC V-6, 4-wheel drive is built to travel over rugged terrain and still perform well. The new trucks, introduced this year, are offered in half-or-three quarter ton versions.

SAE International Coming Next January

Probably the biggest group of engineers ever assembled will take part in the SAE's International Congress and Exposition at Detroit's new Cobo Hall next Jan. 9-13.

More than 15,000 engineers from all over the world will attend. More than 500 displays by suppliers to the aircraft and auto industries will be featured in a 200,000-sq ft area.

"What's significant about the event," says H. E. Chesebrough, president of SAE, "is that it will bring together key engineers from all over the world who will present to us a look into the crystal ball of automotive engineering for the era ahead."

It's been hinted there may be representatives from Iron Curtain countries, although only preliminary communications have been carried out so far.

Theme of the meeting will be "Breakthrough in the 60's." Every branch of the society has examined recent advances in its field and plans at least one session on the implications of the advances in the next decade.

2 ... prefinished and pretested ways to cut production costs!

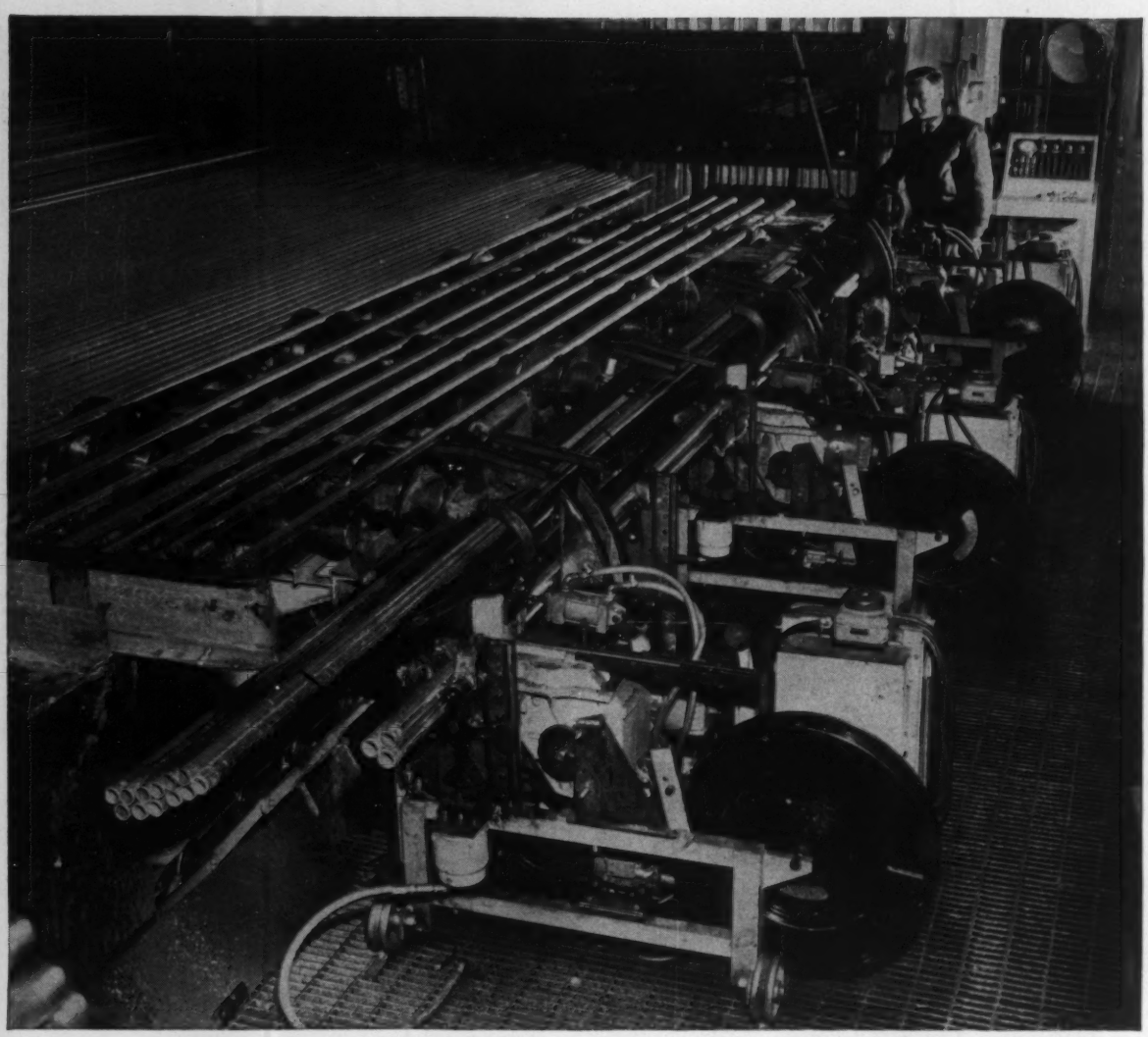
CAN YOU AFFORD TO BUY LESS EXPERIENCE?

Pre-coating offers many ways to save. Many parts now stamped or formed before finishing could be produced at lower finished cost from *pre-coated* metal strip or sheet.

No need to wonder how coatings will stand up, either, if you use or specify Sherwin-Williams SUPERCLAD or KEMCLAD Enamel Strip Coatings. They have been proved in exterior exposure applications of coated aluminum house-siding, on more than 1,000,000 homes, for periods up to 14 years. They reflect a record of experience as leading finishes for Venetian blinds, for washing machines and for many other uses.

Investigate today what pre-coating, and these leading products of the pre-coating industry, can offer you in production savings . . . in outstanding performance . . . in new product advantages. Ask your Sherwin-Williams Industrial Representative, or write The Sherwin-Williams Co., General Industrial Division, Cleveland 1, Ohio.

SHERWIN-WILLIAMS / INDUSTRIAL FINISHES



Courtesy of Blaw-Knox Company, Aetna-Standard Division

New Signode machines bundle pipe in seconds

Three synchronized Signode Model MS2BR power strapping machines are at work here. They automatically apply three straps per bundle. With these machines, it is now possible to keep ahead of the production of high speed pipe mills. Uniformly tight bundles are produced.

Similar Signode power strapping machines for pipe bundling have been proved dependable in more than six years of pipe mill service. They are ideal for strapping electrical metallic tubing and rigid conduit, as well as pipe. Write for more information about these machines or this installation. Signode counsel is available to help you work out a strapping installation that meets your requirements, no matter what your product. No obligation. Just write:

First in steel strapping

SIGNODE STEEL STRAPPING CO.

2623 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Credit Eased in Pep-Up Drive

Wanted: More Steam in Economy as Elections Near

Interest rates are coming down; defense spending is going up, as part of Administration plan to have business healthy at election time.

And Democrats vie with Republicans at pump handle.—By G. H. Baker.

■ It's now clear that money and credit will be in easier supply for at least the next six months.

The Eisenhower Administration's old policy of "tight money" has been shelved.

Interest rates are coming down.

Defense spending is going up.

Loans of all types—industrial, consumer, and farm borrowing—will be much easier to undertake from here on.

Administration Plan—The "easy money" policy is part of a carefully-calculated Administration plan to pep up the U. S. economy before the November elections. Administration officials prefer to put it a little smoother than that. For example:

"Inflation psychology has lessened, making possible lower interest."

And this:

"The stability of industrial production now warrants encouragement of spending."

Four More Years—To be blunt about it: the Eisenhower Administration is trying hard to extend the Republican reign in the White House another four years, and it has no intention of having a recession on its hands come Election Day.

Defense Spending — The White House decision to spend more money on defense — now that Russia's bristling military attitude has re-asserted itself — does not have to be justified to the Congress. Even before President Eisenhower could tell Congress his plans for spending more dollars on missiles, the Congress beat him to the punch by adding more defense procurement dollars to pending bills.

Democrats Too—As for borrowing, it is difficult to say whether the Democrats or the Republicans have been doing the most in recent weeks to make it easier to obtain Small Business Administration loans, farm loans, or the diversion of government contracts into depressed areas. Both political parties are especially anxious to see that popular clamor for easier money is promptly met.

No Boom—Despite all this extra pump-priming, government economists say there is almost no chance that production and sales will develop into boom proportions by November. The necessary ingredients for a true boom—plenty of money in circulation and a strong appetite by both businessmen and consumers for expansion—are simply not present.

What we can expect, however, is more or less an extension of the present "good" business conditions. Consumer spending is holding up at strong levels. Personal income, now running at the annual rate of slightly more than $400 billion, is likely to hit the rate of $406 billion by September and $411 billion by November.

U-2 Backlash: Policy Changes

■ Khrushchev's continuing outbursts of temper are forcing some important changes in U. S. national policy for the months ahead.

President Eisenhower and Congressional leaders alike are now agreed that K's venomous spluttering against the free world is likely to increase in tempo, not abate. It is increasingly clear that the Soviet military clique has a gun at K's head. And it has killed off the former Red "peace and friendship" policy for good.

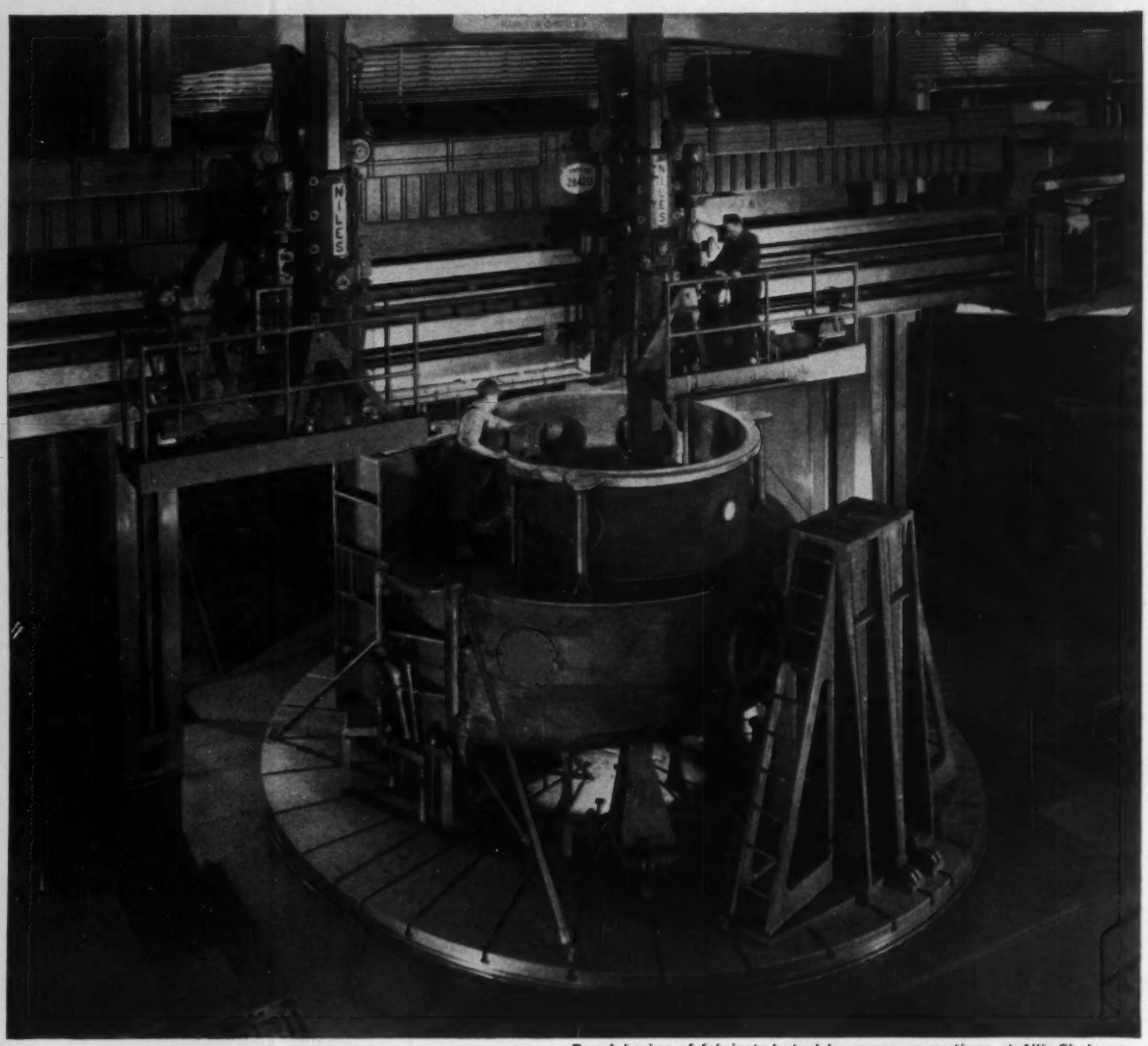
Reds Shaken—How is U. S. industry affected? In several important areas:

To stand our ground with Khrushchev, and at the same time to avoid war, calls for the utmost in political maneuvering. No question but what the world situation will be touch and go in the months immediately ahead. The U-2 incident actually shook Khrushchev and the Soviet military more than was realized at the time.

More Money—Defense spending, already juiced up by an extra $1 billion by a thoughtful and anxious Congress, will climb still higher during the next 12 months. Not as much as demanded by Gov. Rockefeller and Sen. Symington (they want at least $3 billion more), but enough to accelerate many missile procurement programs, plus extra funds for submarines and aircraft carriers.

More loans to developing nations, especially those in Africa, are now in the works as a result of the renewal of bristling international attitudes.

ALLIS-CHALMERS



Rough-boring of fabricated steel low-pressure castings at Allis-Chalmers.

Test track for our own products

Experience in metal fabrication guides the design of products we offer you

Nobody understands the requirements of equipment for the metalworking industry better than people who are in it. As one of the world's largest metal fabricating companies, Allis-Chalmers sees first-hand how its own motors, control, pumps, and induction heaters perform under the severe everyday conditions of heavy usage, abrasive atmosphere and heat.

This experience with our own products lets us know their strong points . . . as well as the areas which might need greater improvement. It guides the design of our products in many ways . . . gives us operating results quickly . . . improves products with a realistic view of the actual conditions in the metalworking industry.

This system of proving Allis-Chalmers equipment and components in our own day-to-day "test track" is one of your greatest assurances of reliability, suitability, quality. *For further information call your nearby A-C distributor, representative, or write* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wis.*

• • •

A-C products for the metalworking industry: Centrifugal and Vacuum Pumps, Compressors, Motors, Control, Valves, Induction Heaters, Rectifiers, Transformers, Switchgear, Unit Substations, Water Conditioning Systems, plus Material Handling Equipment.

A-1320

What Compacts Mean to Farwest

Auto Assembly Work There Due for Boost

In the past, the Farwest has assembled 10 pct of the nation's car output.

Now as compacts are built there, automakers will buy more parts, look for new supply sources.—By R. R. Kay.

■ The trend to compact cars will mean much to the West Coast economy.

General Motors and Chrysler have already said their 1961 compacts are scheduled for assembly on the Coast. Ford hasn't said so publicly. But it's generally expected Ford compacts will roll off its assembly lines there.

Important Market — The Big Three have a huge stake in the Farwestern market. California is the nation's No. 1 state in car sales. The Coast's expanding population makes sales prospects look even better for the region.

Chrysler, Ford, and General Motors are long-time assemblers on the West Coast. They had a good year in 1959. Total units assembled: 585,000.

Boost for Suppliers — But with the coming of the compacts, you can look for bigger auto production there. One thing is certain. The Big Three will buy more from the area's auto parts makers. They're always scouting around for new supply sources.

So if you can make any of the 400 different items carmakers buy, get in touch with them.

Here's a rundown on the compacts—who will make what on the Coast:

Chrysler — Valiant and Dodge Dart get top billing at its Los Angeles plant. Chryslers and DeSotos won't be made there anymore.

General Motors — All three new compacts — Buick's Special, Oldsmobile's F-85, and Pontiac's Tempest—will go into production at the South Gate (Los Angeles area) plant. Both standards and compacts will roll off the same line.

GM is getting into high gear at its Buick-Oldsmobile-Pontiac plant there. Workers are already on a two-shift basis. But the big jump in employment, maybe double, will come this fall. That's when the 1961 models will get under way.

Ford—No plans to assemble its compacts are public. But the company greatly upped its capacity with a new combined Ford - Mercury plant near Los Angeles. So don't be surprised to read that Ford will assemble its Falcon and Comet on the Coast.

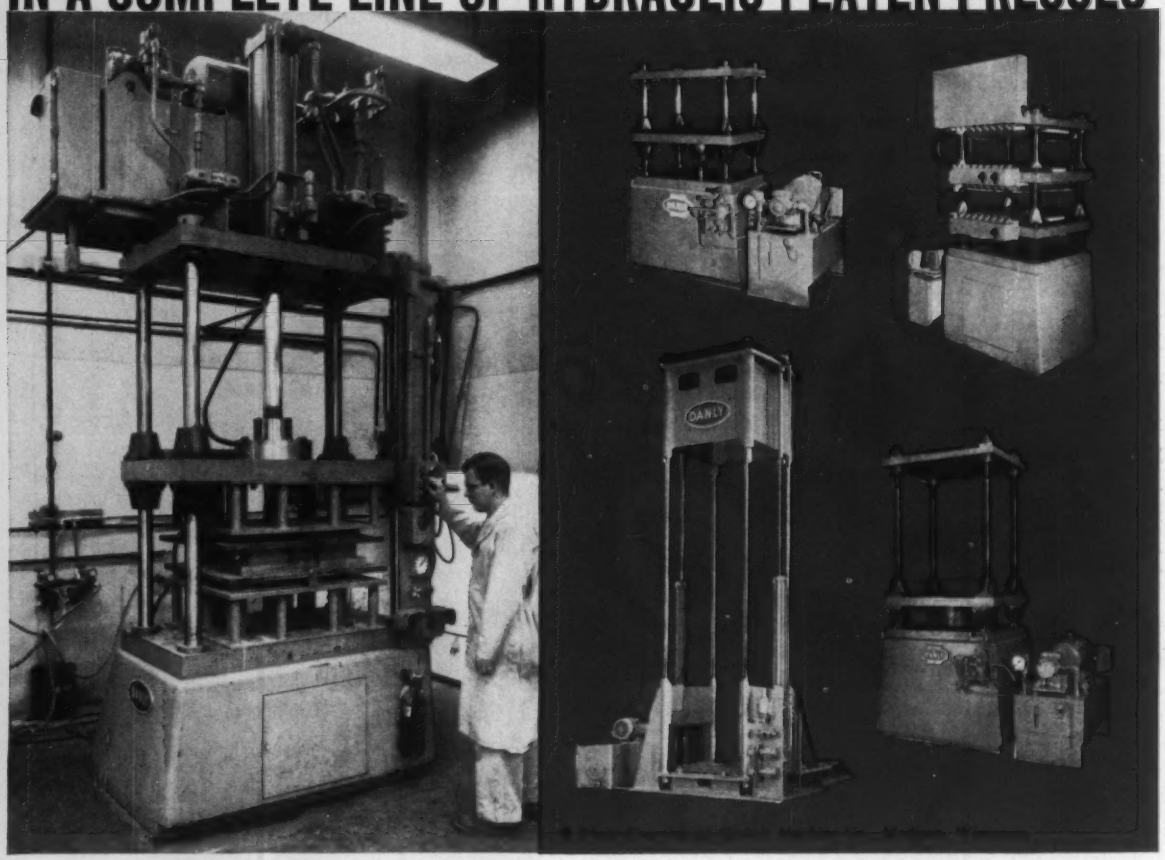
Historically, the West Coast assembles 10 pct of the nation's car output. Automotive brass predict that they'll turn out 6.2 million cars this year. If they're right, the Coast's share should be 620,000 units.

Alloy Aircraft Frame Gets Final O.K.

CANOPY CHECK: Solid-cast aluminum-magnesium alloy canopy for Republic's F-105D is checked out before shipment. Canopy, built by R. H. Osbrink Mfg. Co., Los Angeles, is x-ray tested for any microscopic flaws.

MMT PE

GET DEPENDABLE DANLY PERFORMANCE IN A COMPLETE LINE OF HYDRAULIC PLATEN PRESSES



Danly Hydraulic Platen Presses offer you the extra precision and brawn for which Danly equipment is known throughout industry. Danly presses are engineered to the highest machine-tool standards with design innovations which add the extra measure of performance you want.

You'll find top precision in the long-wearing alloy steel columns, accurately-machined platen faces, and demountable bushings on Danly Platen Presses. Parallelism is held to tolerances equivalent to the finest Danly Precision Die Sets.

Danly Platen Presses are available with one or more moving platens, up-acting or down-acting. Capacities range from 5 to 500 tons. Variations in stroke, speed and pressures are offered as required. Heating elements and other accessories are also available. Your choice of electrical control or lever operation. Whatever you need in a hydraulic platen press you can obtain from Danly. For more complete details and specifications, write for your copy of the new catalog, "Danly Hydraulic Platen Presses."

DANLY

DANLY®

DANLY MACHINE SPECIALTIES, INC., 2100 S. LARAMIE AVE., CHICAGO 50, ILLINOIS

Patents Protect Design Progress

They Are Still the Cornerstone of Tool Design

With millions of patents on record, their value in new design is sometimes questioned.

But evidence shows patents protect design concepts in new tools.—By R. H. Eshelman.

■ When the machine tool industry was in its infancy, individual invention and patent protection no doubt played a large role in successful design.

Attesting this is an exhibit sponsored by the Patent Office in the main lobby of the U. S. Dept. of Commerce. One display by the Cincinnati Milling Machine Company depicts "75 years of machine tool progress under the U. S. patent system."

Times Change — This and exhibits of 16 other firms are designed to show how the patent system has fostered innovations in the field of mechanical devices. The machine tool firm points out the early history of the industry—how many companies were founded late in the nineteenth century based on a simple, but fundamental idea for a unique type of metal cutting machine. Protection afforded by patents allowed these pioneer firms to grow.

But with well over two and a half million patents now on record, what is their importance in design today? Rights for many basic mechanical devices have expired. It might seem that patents have little value in design.

Not true, say patent attorneys and machine tool executives. Patents are still a cornerstone of many firms' designs. Although many basic ideas are now public property, patents can enhance a product, improve competitive position.

Individual Effort — And many original concepts still come from individuals, not just from the big industry laboratories.

To put these basic concepts into usable form, however, often means that R & D departments make many improvements and refinements. These usually result in many more patents than the individual acquired. And in any development program, designers and engineers find a "patent art collection" extremely valuable as a source of technical information.

Cincinnati Milling reports several important steps in creation of a new product:

1. Exchange of ideas leading to creativity.
2. Scientific analysis of new concepts.
3. Design of prototype.
4. Management approval to manufacture and market.

Gear Makers Elect New Officers, Name Award Winner

NEW AGMA HEADS: Newly elected officers of the American Gear Manufacturers Assn. are (l. to r.): President—J. F. Murray, president, Winsmith, Inc.; Vice President, Products Div.—C. F. Bannon, vice president, Western Gear Corp.; Vice President—Technical Div. (re-elected) Folke Richards, consulting specialist, gearing products, Westinghouse Electric Corp.; and Treasurer—J. H. Harper Jackson, Sales Mgr., Jackson Gear Co. E. J. Wellauer; Falk Corp., received the AGMA's "Edward P. Connell" Award.

INDUSTRIAL BRIEFS

New and Precise—A new precision wire plant will be erected by Fort Wayne Metals, Inc. It is planned for a total size of about 90,000 sq ft by 1965. Construction on the first 30,000 sq ft portion of the new plant will begin this summer and will be in operation before mid-1961. Cost of the first unit is estimated at $250,000.

End Result—Micro-Path Inc., a wholly-owned subsidiary of United Industrial Corp., has formed a new Instruments Div. It is the result of the acquisiton of manufacturing, sales and distribution rights to all electronic and chemical devices produced by Robert R. Austin Laboratories, San Gabriel, Calif.

On the Line — Aeronca Mfg. Corp., has purchased The United Welding Co., Middletown, O. The cash purchase price of $650,000 included United Welding's name and inventory as well as a lease with option to buy on land, buildings and equipment valued at $550,000. No exchange of stock was involved in the transaction.

Poll Toll—G. J. Huebner, Jr., executive engineer, research, in Chrysler Corp.'s Engineering Div., has been elected president of the Chrysler Institute of Engineering. He has served since 1947 on the Institute's board of trustees and board of administration.

Plastic Molders—Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., and Modern Designers, Hialeah, Fla., has formed Industrial Plastic Molders, Inc. The new company will manufacture injection molded plastic parts. R B & W holds controlling interest in the new company, successor to Modern Designers.

Now It's Bendix Corp.—Bendix Aviation Corp. is now known as The Bendix Corp. Reason for the change is that the corporation is engaged in the manufacture and sale not only of aviation products but a number of automotive, electronic, nuclear, missile and space, marine, machine tool and industrial products.

Buy for CB&I—Chicago Bridge & Iron Co., Chicago, has purchased the field automatic overlay welding operations of The Portland Co. Major personnel of the Portland overlay welding group have joined CB&I as part of the transaction. Automatic overlay welding is used to provide corrosion and erosion resistant linings for interiors of carbon steel tanks and towers.

Named by BDSA—F. A. Weiss was named assistant director for mobilization planning in the Copper Div., Business and Defense Services Administration, U. S. Dept. of Commerce. Mr. Weiss is superintendent, industrial and labor relations, in the Baltimore, Md. Works of the Western Electric Co.

Puerto Rican Prospects—A portfolio outlining Puerto Rico's U. S.-affiliated metalworking and electric products has been issued by the Commonwealth's Economic Development Administration. It reveals how the economy has tripled every two years since 1950 and annual sales have risen 1000 pct to $66 million since 1952. The Portfolio can be obtained from: Economic Development Administration, 666 Fifth Ave., New York 19, N. Y., Dept. PRM.

"I wonder if your brother ever heard about the 'right to work' law?"

Acme Expansion—Acme Industries, Inc., Jackson, Miss., will build a branch manufacturing plant at Greenville, Ala. The plant will manufacture component parts for commercial and industrial air-conditioning and refrigeration equipment. Grading on the site is scheduled to begin immediately, with completion in October.

Transferred—The Ferracute Machine Co., Bridgeton, N. J., has acquired from The Oliver Corp., the complete line of Farquhar Hydraulic and Mechanical Presses. A. B. Farquhar Co. has been manufacturing machinery in York, Pa. for over 100 years. In recent years it has been a division of The Oliver Corp.

New Founders Officers — C. P. Speitel, president, Pennsylvania Malleable Iron Corp., has been elected president, Malleable Founders Society. R. S. Bradshaw, president and general manager, Texas Foundries, named vice president. Three new directors are: C. I. DeShong, Jr., Oriskany Malleable Iron Co.; L. J. Gallagher, The Dayton Malleable Iron Co., and W. M. Dalton, The Dalton Foundries.

New Aluminum Smelter—Aluminum Co. of America has started operating its ultra-modern $80 million Warrick, Ind., smelter. The sprawling works is initially operating one of five potlines with a capacity of 35,000 tons of aluminum annually. Total capacity of the facility will be 175,000 tons of metal a year.

Rolling Along — Republic Foil Inc. will build a new rolling mill at the company's Rolling Mill Div., Danbury, Conn. Cost of the high speed, four-high rundown strip mill is $750,000. An initial mill operation is scheduled for January, 1961.

New Bosses—National Malleable & Steel Castings Co., Cleveland, acquired ownership of Hill, Hubbell & Co., a division of General Pacific Corp. The transaction was approved by General Pacific shareholders on May 20. Consideration was about $3 million.

Only Carlson produces all plate thicknesses in all these superior grades of stainless steel

309
309S
309SCb
310
314
316
316L
317
317L
D319
D319L
17-4 PH*
17-7 PH*
PH 15-7 Mo*

IN addition to the more usual grades, Carlson regularly produces stainless steel plate and plate products in this wide range of superior analyses in any thickness. Many of these grades are included in our mill inventory; the others can be rolled to your order.

These chromium-nickel analyses were developed to more closely match the exact requirements of process, nuclear, and space equipment. Each has one or more of the following advantages: increased corrosion and/or heat resistance, good machinability, ease of fabrication, and exceptionally high physical properties with low temperature heat treatment. By selecting the grade that gives you the combination of advantages you want, your costs can be reduced and the trouble-free life of your equipment extended.

Write today for details on these superior grades and for inventory information on all types of stainless steel plates and heads.

*Trade marks of Armco Steel Corporation

G.O.CARLSON Inc.

Stainless Steels Exclusively

120 Marshalton Road
THORNDALE, PENNSYLVANIA
District Sales Offices in Principal Cities

Plates • Plate Products • Heads • Rings • Circles • Flanges • Forgings • Bars and Sheets (No. 1 Finish)

Ed Weiner, president, talks with Ed Lebowitz, right, Chesterfield's superintendent, by one of the firm's three Wean Equipment slitting lines.

Chesterfield Steel relies on speed, accuracy, durability of Wean coil processing lines

Fast delivery—when, where, and how the customer wants it—is the metal warehouse's stock-in-trade. And Ed Weiner, president of Cleveland's Chesterfield Steel Service Co., is proud of the firm's record for on-time, "on-spec" deliveries of strip and sheet steel, nonferrous and coated metals.

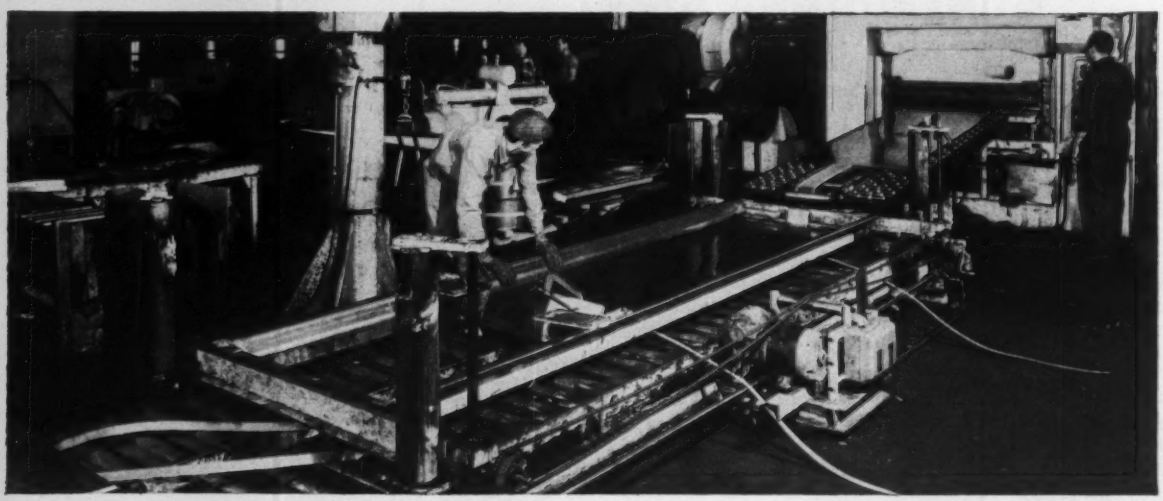
To maintain this reputation for service, Chesterfield needs equipment that will maintain its accuracy under tough, 3-shift, week-long operation. That's why this progressive firm has installed three Wean slitting lines and the 52″ Wean flying shear line shown below . . . and is ordering another flying shear line for 60″ wide strip. Most of the firm's orders for sheet material pass through this coil processing equipment, making both speed and reliability of operation vital. Mr. Weiner notes that the Wean 52″ flying shear line has doubled sheet production over other types of lines previously used by Chesterfield.

Like Chesterfield, Wean has established a reputation as one of the most knowledgeable firms in the field of coil processing and has built equipment that is now serving many of the country's largest metalworking firms. Write for a brochure covering the important savings *you* can realize from coil processing.

WEAN EQUIPMENT CORPORATION
22800 Lakeland Boulevard
CLEVELAND 17, OHIO

WEAN

Wean flying shear line has elevating run-out conveyor and side guides which adapt to pack height.



L. J. Kevitt, named general manager, Bower Roller Bearing Div., Federal - Mogul - Bower Bearings, Inc., Detroit.

Vickers Inc., Electric Products Div.—**G. H. Clayton,** elected vice president.

Allegheny Ludlum Steel Corp.—**R. E. Christian,** named general superintendent and **D. I. Odelius,** named superintendent — normalizing, Bagdad operation, West Leechburg Works.

The Youngstown Sheet & Tube Co.—**T. S. Hanson,** appointed asst. supervisor, industrial relations, Chicago district.

Jessop Steel Co.—**C. M. Carlisle,** named technical director.

Jones & Laughlin Steel Corp., Stainless and Strip Div.—**W. I. Weed,** appointed supervisor, quality control at the Detroit plant.

Emcor Ingersoll Products Div., Borg-Warner Corp.—**M. J. Votava,** appointed sales manager.

Goodyear Tire & Rubber Co.—**A. J. Gracia,** named director, general research and development and **W. J. Lee,** appointed director, tire research and development; **M. J. DeFrance,** becomes manager, commercial development, and **J. A. Merrill,** named asst. director, Research Div.

Wheeling Steel Corp.—**J. C. Mallory,** appointed manager, tin plate sales.

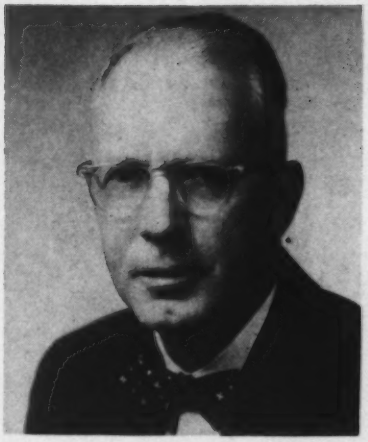
Westinghouse Electric Corp., Elevator Div.—**R. C. Robinson,** named manager, Dover, N. J., plant; **M. E. Hill,** appointed manager, manufacturing planning for the division.

U. S. Steel Corp.—**J. J. Lennon, Jr.,** appointed asst. manager, sales, Pittsburgh district.

Wheeling Steel Corp.—**J. A. Holloway,** appointed asst. general manager, Sales.

The Reliance Electric & Engineering Co.—**R. F. Kendall,** named director, purchases.

Industrial Div., The Timken Roller Bearing Co.—**D. L. Hart,** appointed Los Angeles district manager.



R. A. Shaw, appointed vice president, manufacturing operations, American Bridge Div., U. S. Steel Corp., Pittsburgh.

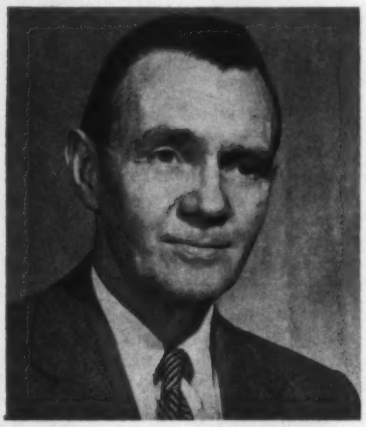
The Westinghouse Electric Corp.—**D. J. Povejsil,** named director, new product services.

Jessop Steel Co.—**G. S. Miller,** named director, industrial relations.

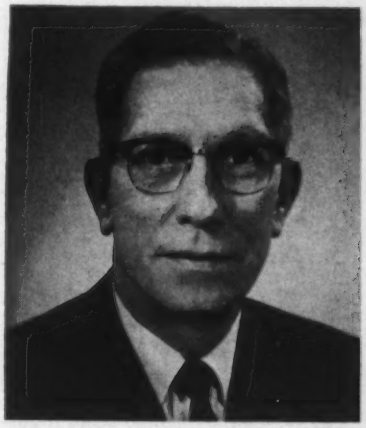
General Electric Co.—**L. W. Goostree, Jr.,** appointed manager, marketing, Computer Dept.; **G. A. Hagerty,** named manager, process computers.

The Black & Decker Mfg. Co.—**J. C. Jolley,** appointed sales repre-

(Continued on P. 114)



William Rodgers, appointed chief metallurgist, Republic Steel Corp.



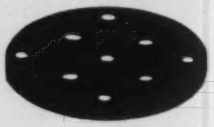
A. G. Forrest, named asst. chief metallurgist, Republic Steel Corp.

W. R. Compton, elected secretary, Jones & Laughlin Steel Corp.

Maine Quiz #2

Can you identify these metal products produced in

MAINE?



Answers — 1. Weathervane
2. Manhole Cover 3. Tackle Block
4. Machine Gun

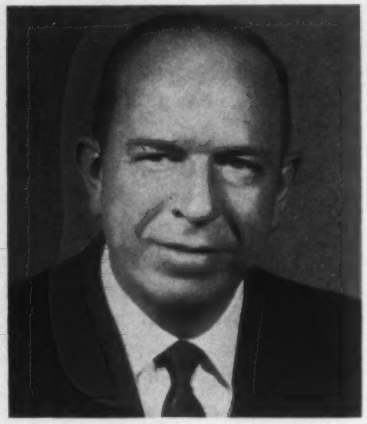
Currently 150 metal working plants manufacturing machinery and ordnance parts, fabricated metal products, transportation equipment, and primary metal products are located in Maine. Over 5000 skilled workers produce thousands of machine tooled products daily.

Maine will produce the item of your choice. *Maine is the state for your new plant.* Write for our 56-page directory of the metal working industry in Maine and the *plan for 100% financing of new construction.*

Lloyd K. Allen, Commissioner
Maine Department
of Economic Development
State Capitol Augusta, Maine

(Continued from P. 109)

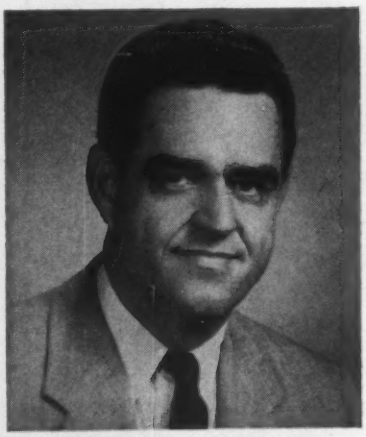
sentative, Los Angeles district, Hardware Div.; **J. R. Moore,** appointed sales representative, St. Louis district, Hardware Div.; **E. R. Hassell,** appointed sales representative, Industrial - Automotive Div., New York district; **J. H. Beaumont,** appointed San Francisco branch service manager; **D. S. Stevens,** appointed acting branch service manager, Seattle.



R. J. Ackerman, appointed works manager, Cadillac Motor Car Div., General Motors Corp.

The Steel Co. of Canada, Ltd., Rolling Mill Products Div.—**J. D. Allan,** appointed asst. general sales manager.

International Rolling Mill Products Corp., Fabrication Div.—**W. C. Browne,** appointed manager; **L. T. Arnold, Jr.,** named asst. manager.



J. W. Collier, named chief industrial engineer, Latrobe Steel Co., Latrobe, Pa.

C. T. Heppenstall, appointed manager, specialty product sales, Heppenstall Co.

Minneapolis Electric Steel Castings Co.—**A. D. Moll,** appointed sales manager.

Alloy Rods Co.—**W. C. Clark, Jr.,** appointed eastern regional manager.

Plume & Atwood Mfg. Co.—**T. Q. Raney,** appointed New England district sales manager.

M. L. Henry, appointed production manager, brass strip operations, Western Brass plant, Olin Mathieson Chemical Corp.'s Metals Div. in East Alton, Ill.

Macwhyte Wire Rope Co.—**R. F. Hendrick,** appointed asst. Pacific Coast manager.

Bethlehem Steel Co.—**C. W. Ganzel,** appointed manager, pipe

(Continued on P. 114)

AGAIN

P-K Internal-Fin Coolers can be furnished insulated with Rock Cork laid in asphalt and covered with a heavy steel jacket. Illustration shows insulated cooler.

Revere helps fit the metal to the job

AND PATTERSON-KELLEY CUSTOMERS SAVE 3 WAYS

Because of its unique design, the Patterson-Kelley Freon Water Cooler shown at right above saves space, requires less Freon, while its reduced weight and size mean lower cost.

With the P-K Type FO Internal-Fin Freon 22 Water Cooler the installation can be designed for a shell 2 diameters less and 1 to 2 feet shorter than with conventional plain or bare tube coolers. This is made possible by the use of ¾" O.D. x .035" gauge Revere copper tube drawn over a Revere aluminum extruded fin as shown above. Serrated surface of the fin enhances refrigerant vaporization.

By making both the tube and the extruded fin, and assembling them in the same plant a tight contact between the two metals is assured, thus establishing maximum heat transfer. Once again Revere has helped fit the metal to the job, money was saved and a more efficient product produced.

Why not consult with Revere's Technical Advisory Service and take advantage of its extensive knowledge in "fitting the metal to the job." This Service has saved others money, why not you?

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Rome, N.Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N.Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities. Distributors Everywhere.

SERVICE CENTERS?

WHO NEEDS 'EM?

"Sure, it's a little crowded around here, but by golly we found room for a good, safe stock of steel.

"It's a bit tricky finding the pieces we need, maybe, but the stuff is here, all right—somewhere.

"Fact is, you caught me in the act of writing an order for another batch of steel. Can't afford a secretary any more. Can't afford a typewriter, either. Had to hock everything in sight to scrape up some more capital.

"By the way, could you lend me a stamp?"

FOR FAST DELIVERY . . . FOR STEEL TAILORED TO YOUR REQUIREMENTS . . .

Call Your Steel Service

BETHLEHEM STEEL COMPANY,

Our friend may not agree, but it's a fact that the cost of steel inventories can be a major cost of doing business. Many firms have found that this cost can be kept in line by letting Steel Service Centers carry their inventories.

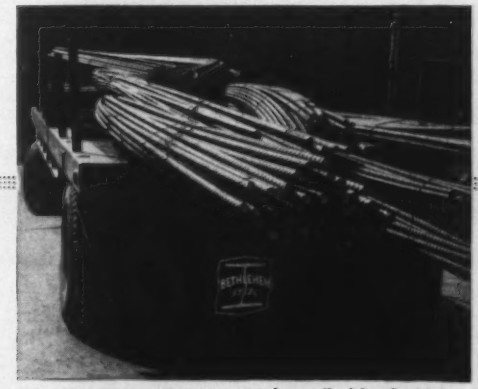
Service Centers maintain a bigger stock and a wider range of steel products than most companies could hope to carry. Furthermore, they are equipped to process this material as required and deliver it *fast*—right to your door.

CARBON AND ALLOY BARS, made from new-billet steel, are readily available in all standard grades, shapes, and sizes, from Service Center stocks.

SHEETS—hot-rolled and cold-rolled—as well as Bethcon (Bethlehem's continuously galvanized steel sheets) can be purchased from Service Centers coiled, sheared, or slit to the desired dimensions.

PLATES AND TOOL STEEL are additional Bethlehem products supplied through Steel Service Centers.

STRUCTURAL AND BAR-SIZE SHAPES from Bethlehem mills are available from the ample stocks of many Steel Service Centers. They'll cut them to length, too.

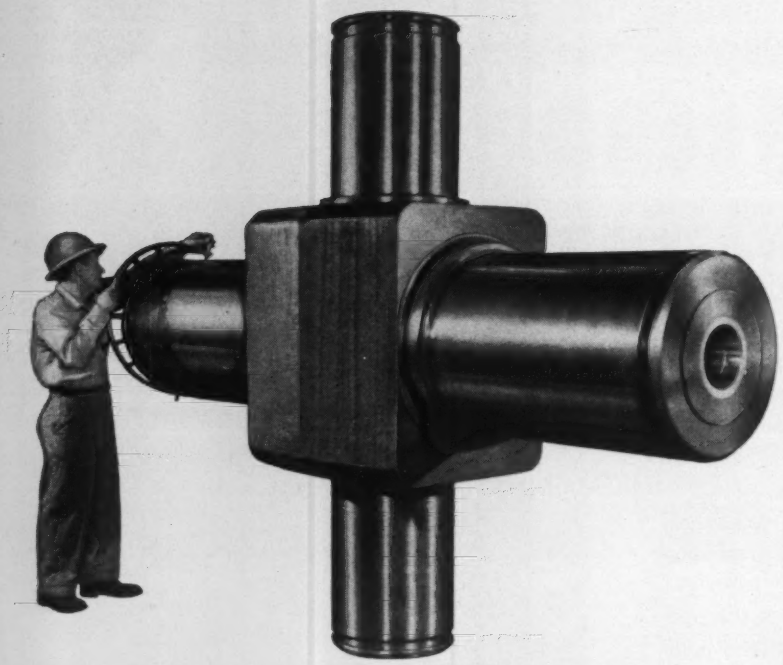


CONCRETE REINFORCING BARS, hot-rolled by Bethlehem from new-billet steel to ASTM specifications, are available in sizes No. 2 through No. 18-S.

Center

BETHLEHEM, PA.

BETHLEHEM STEEL



13½ TON EQUALIZING AXLE from BLUEPRINT to FINISHED PART by FINKL

This 27,000 pound steel forging,* made to support a million pound load, was completely manufactured from molten steel to a finished machined part in the Finkl shops.

A 115,000 pound electric furnace steel ingot was cast, forged, hot cut and heat treated, followed by hundreds of hours of rough and finished machining. Then the square section was heated to accept the horizontal part to complete the shrinking operation to make this equalizing axle.

Finkl is well-equipped to engineer and produce a wide range of forged parts . . . our sales engineers will be pleased to talk to you about your forgings, hot work steels and die block needs.

*Replaced a casting

HOT WORK STEELS · DIE BLOCKS · FORGINGS · ELECTRIC FURNACE STEELS

Manufacturers of the
largest forgings in the Middle West

A. Finkl & Sons Co.

2011 SOUTHPORT AVENUE • CHICAGO 14, ILLINOIS

Offices in: DETROIT • CLEVELAND • PITTSBURGH • INDIANAPOLIS • HOUSTON
ST. PAUL • COLORADO SPRINGS • SAN FRANCISCO • SEATTLE • BIRMINGHAM • KANSAS CITY
BOSTON • LOS ANGELES Warehouses in: CHICAGO • DETROIT • BOSTON • LOS ANGELES

(Continued from P. 110)

and tube sales; **F. W. West, Jr.,** named manager, sales, Cleveland district, and **W. E. Hotaling,** named asst. manager, Plate Sales Div.

A. G. Scott, named asst. general manager, sales, Pittsburgh Steel Co.

Calvin Irish, appointed manager, product engineering, National Automatic Tool Co., Inc., Richmond, Ind.

OBITUARIES

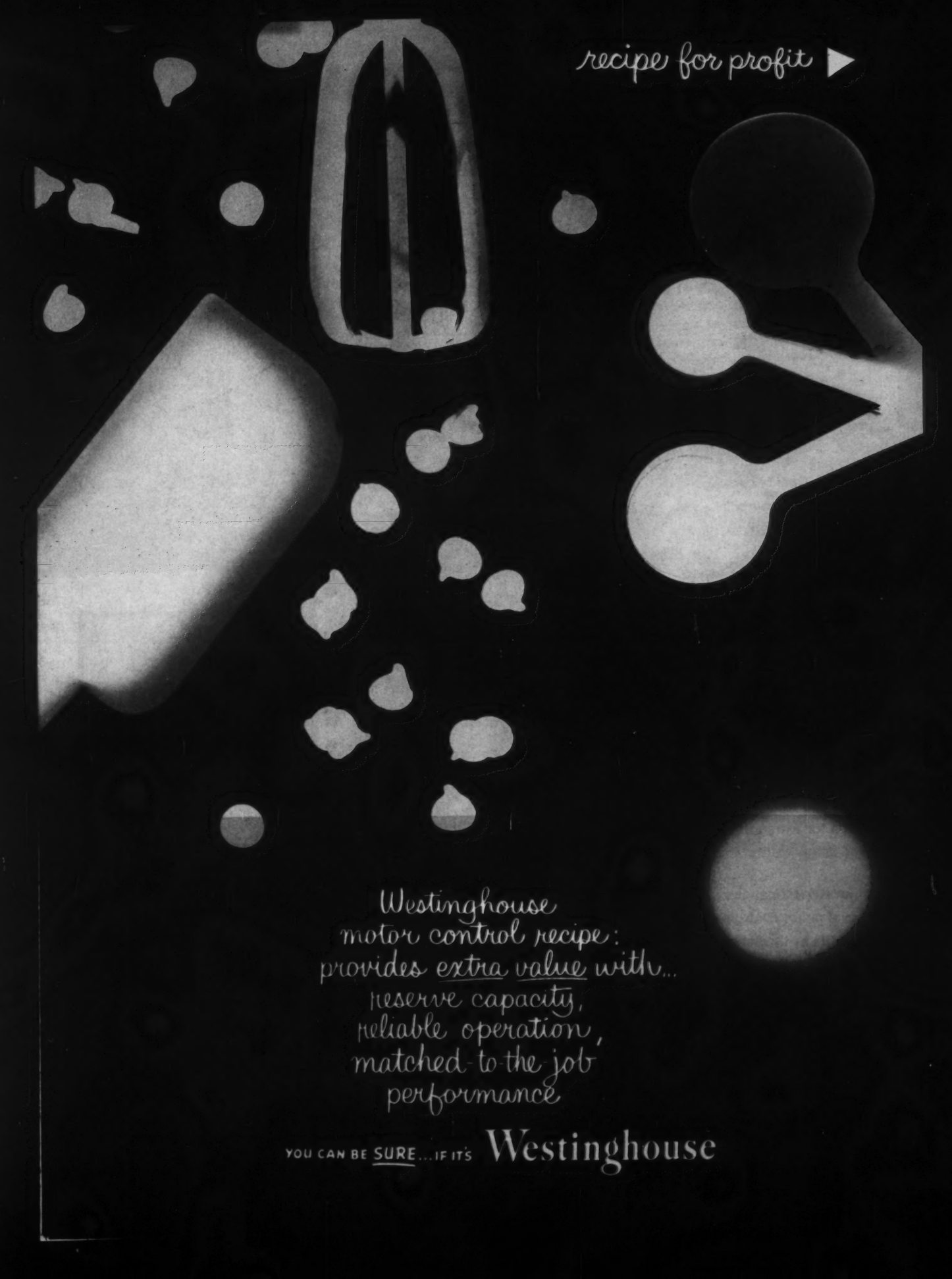
B. L. Verner, 53, vice president, Pittsburgh district, Luria Brothers & Co., Inc.

J. W. Fribley, 73, founder and president, Cleveland Cap Screw Co.

R. D. Thomas, chairman of the board, Arcos Corp., Philadelphia.

A. A. Hupp, 57, manager, Cincinnati branch, Central Steel & Wire Co.

W. A. LaVallee, direct sales representative, Chicago office, Gisholt Machine Co.


recipe for profit
Westinghouse
motor control recipe:
provides extra value with...
reserve capacity,
reliable operation,
matched-to-the-job
performance
YOU CAN BE SURE... IF IT'S Westinghouse

TESTED RECIPES FOR PROFIT . . .

Westinghouse blends "hidden" ingredients in extra value controls for profitable plant operations

- Quality control
- Design ability
- Quality components
- Application experience
- Manufacturing know-how
- Maintenance facilities
- Extensive research

How does Westinghouse handle this basic control recipe to make the result superior to any other? The best chef knows that the quality of the ingredients used and the mixing knack account for the blue-ribbon winners.

At Westinghouse, highest quality control components plus a large portion of expert manufacturing skill, craftsmanship and experienced know-how are carefully blended. Such "hidden" ingredients mean industrial motor controls with reserve capacity to handle overloads . . . long, trouble-free service . . . and performance custom-matched to your needs. Qualities that give **more control value for your money.** Qualities more than sufficient to meet today's demands for extraordinary reliability. That's why it pays to look beneath the surface of any control to be sure you are getting Westinghouse quality.

Your local Westinghouse representative is ready with a wide selection of industrial motor controls. Ask him to tell you more about their **hidden values** . . . benefits by the baker's dozen . . . for more profitable plant operations.

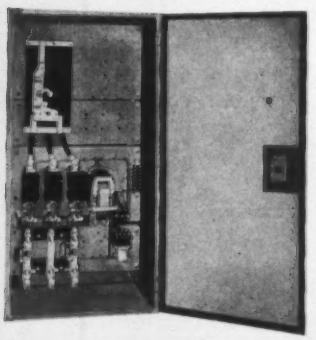
The proof of Westinghouse controls is in their using!

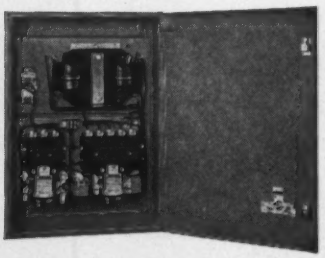
Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

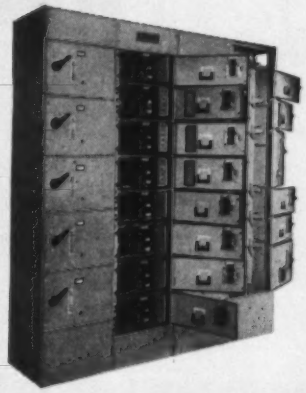
YOU CAN BE SURE...IF IT'S Westinghouse

TUNE IN WESTINGHOUSE-CBS TV RADIO COVERAGE, PRESIDENTIAL CONVENTIONS, JULY 10-29

Check your favorite chef's best dish. The recipe calls for the finest ingredients. However, real success comes from devoted attention to details. Superior product quality, likewise, requires premium components and craftsmanship.







Control Centers

Compact grouping of all motor controls
cuts installation time;
frees production areas;
permits easy one-man
control supervision;
speeds maintenance and service.

Interchangeable modular construction.

DESIGN TESTED AND PROVED in the Westinghouse HIGH POWER LABORATORY

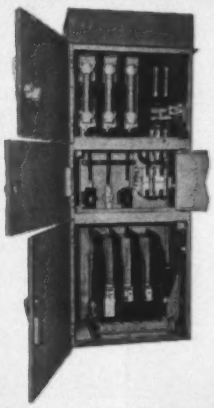
Life-Line® Starters

Full-voltage, a-c magnetic starters in all NEMA enclosures.

Time-tested components . . . straight-through wiring, front-accessible parts combine to slash installation and maintenance costs.
proved De-ion® arc quencher increases contact life . . .
silver plated interchangeable contacts . . . clapper-type operating mechanism . . . smaller compact designs.

Single phase or polyphase; up to 600 volts — reversing or non-reversing;

Non-combination or combination with disconnects or circuit breakers.



Ampgard* High-Voltage Starters

Maximum protection for motors, systems and personnel.

Faults interrupted in less than ½ cycle . . . isolates fault to prevent shutdown of other equipment.

Completely front accessible.

Externally operated line isolating switch.

Exclusive mechanical and electrical interlock . . . prevents switch operation under load; automatically stops motor when cabinet is open.

Full line available . . .
for squirrel-cage, wound-rotor and synchronous motors up to 3000 hp — up to 5000 volts.

* Trade-Mark

Reduced Voltage Starters

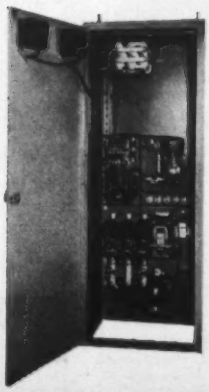
Widest possible selection of primary resistor, auto-transformer, part-winding and star-delta types for squirrel-cage, wound-rotor and synchronous motors in all hp ratings — up to 600 volts.

Manual and magnetic starters to provide the proper starting characteristics for any application.

Available with integral circuit breaker or disconnect switch — fused or non-fused.

Enclosures available for every need . . .
general purpose . . . dust-tight industrial . . .
watertight . . . explosive atmospheres.

Available for immediate delivery.



Static Slipsyn® Synchronous Motor Control

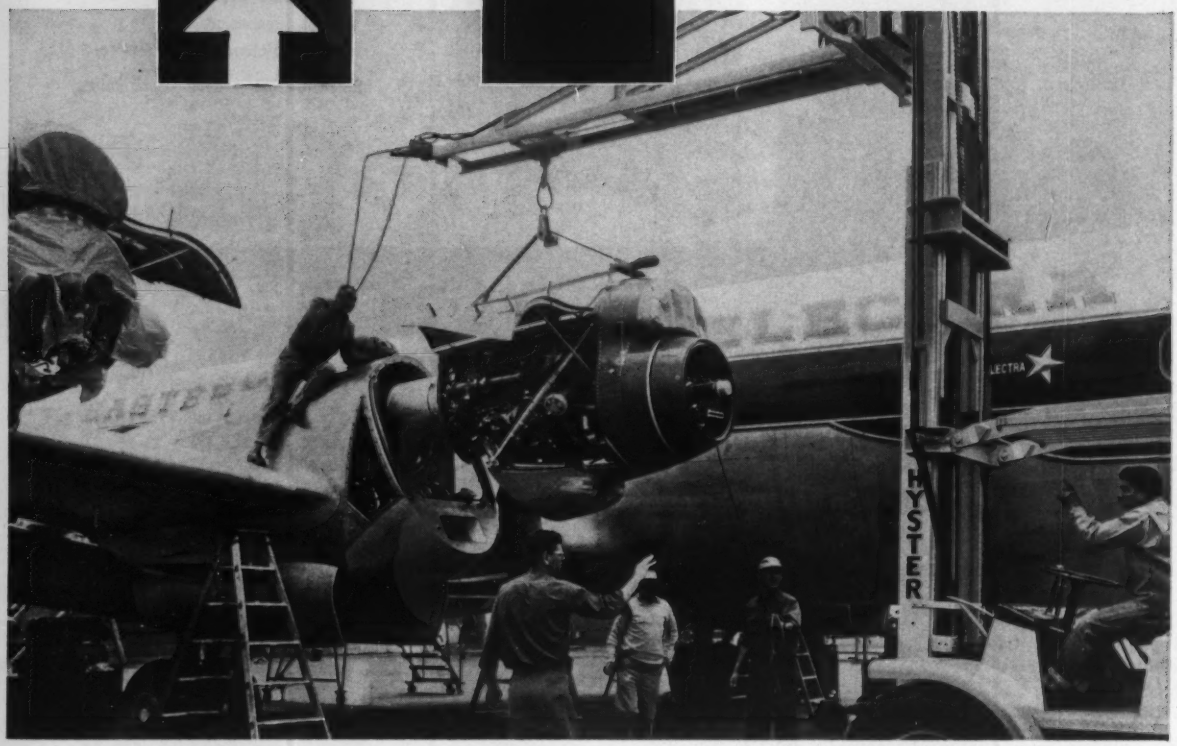
Static transistor circuit guarantees . . . maximum reliability and accuracy; no moving parts to wear, corrode or fail; unaffected by contaminated atmosphere.

Motor field excitation applied at precise speed and pole position.

Adjustable pull-out protection, permits immediate detection or delays action to eliminate false tripping caused by transients.

Available as complete starter or field conversion unit for **any make** control!

HYSTER



Precision handling–

HYSTER® has it!

Leading airlines rely on Hyster lift trucks for fast jet engine changes. Special hydraulic attachments mean precision control on this tough job.

For heavy handling jobs of one to twenty tons Hyster has the truck to fit your requirements.

For more information, call your Hyster dealer or write for literature.

INDUSTRIAL TRUCK DIVISION—Lift trucks, mobile cranes, straddle carriers
TRACTOR EQUIPMENT DIVISION—Construction and logging equipment
MARTIN TRAILER DIVISION—Heavy machinery hauling trailers
INTERNATIONAL DIVISION—Overseas manufacturing, sales and service

Factories: Portland, Oregon (Home Office) • Danville, Ill. • Peoria, Ill. • Kewanee, Ill. • Nijmegen, The Netherlands • Glasgow, Scotland • Sao Paulo, Brazil • Sydney, Australia (Licensee)

HYSTER

HYSTER COMPANY
INDUSTRIAL TRUCK DIVISION
P. O. Box 847 • Danville, Illinois

EXPERIMENTAL SETUP: Quick immersion in ultrasonic tank cleans strip. Wetting fluid recirculates at 160°F.

Ultrasonics Frees Smudge Film From Descaled Steel Strip

Residual smut on shotblasted steel strip penalizes many surface finishing operations.

Low cost ultrasonic cleaning removes this smut—and precludes waste-solution disposal.

By J. J. Obrzut
Technical Editor

■ An ultrasonic cleaning process provides low cost removal of residual smudge from descaled steel strip. And it offers many extras. It even precludes problems of stream contamination and waste disposal.

The shotblast method of descaling strip continues to become more and more popular. In some cases it's possible to use shotblasted strip without additional surface cleaning.

But when cold-rolling or cold-forming operations follow descaling, all traces of powdered scale must be removed. If not removed, the residual scale causes smut on the strip during the follow-up processes.

Hinders Operations—This smut penalizes further finishing work. It also tends to build up on work rolls in rolling mills.

Ultrasonic cleaning, which removes the smut, eliminates the problems normally associated with pickle-liquor disposal. Since nearly a billion gallons per year of acid solutions is now being used to pickle steel, current disposal costs are quite high.

Elimination of water pollution is a bonus—over and above the savings in pickle-liquor purchase and disposal costs. By doing away with the disposal problem, tons of dissolved iron—usually thrown away with the spent acid—remain in a position for ready reclamation.

Numerous Advantages — There are many reasons for the increased interest in shotblasting. Major reasons include: reduction in costs due to the purchase of hot-rolled bands instead of pickled and oiled strip; lower initial investment than complete pickling facilities; and a decrease in the massive pickle-liquor disposal problem.

Tests, taking place at the Hagerstown, Md., laboratory of the Pangborn Corp., are currently proving out a vital breakthrough in the descaling of hot-rolled steel. A new process is being pioneered on a joint basis by the Branson Ultrasonic Corp., Stamford, Conn., The Wean Engineering Co., Warren, O., and the Pangborn Corp.

The problem under attack

centers on a thin, barely discernible film of smudge. Although it's hard to see, this smudge is a real trouble-maker. It must be removed from any blast-descaled strip that's intended for cold rolling, cold forming or hot-dip zinc galvanizing.

Experimental Unit — Ultrasonic cleaning, a follow-up to blast descaling, is being checked out. Results look promising.

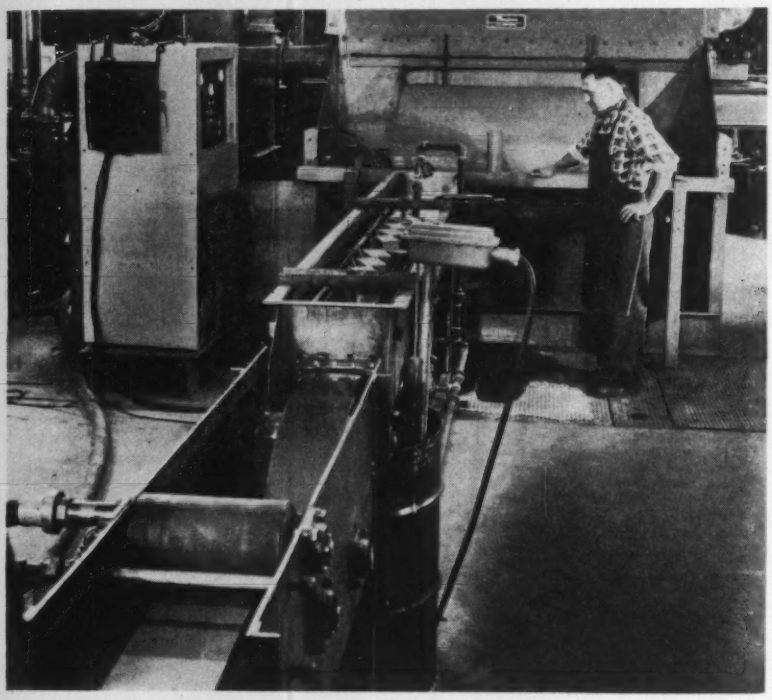
A prototype cleaning line, at Pangborn's lab, begins the cleansing cycle with a roll-type uncoiling mill. The mill feeds the strip into a full-sized Rotoblast descaling machine. This machine is one of Pangborn's standard models.

In the descaling machine, four 75-hp centrifugal wheels hurl a total of 400,000 lb of Rotoblast steel shot per hour. This descales both sides of the steel strip at the same time.

After blast, the strip moves into the ultrasonic tank. This tank is 8 ft long, 1 ft wide and 1 ft deep. Immersion varies from four to eight seconds.

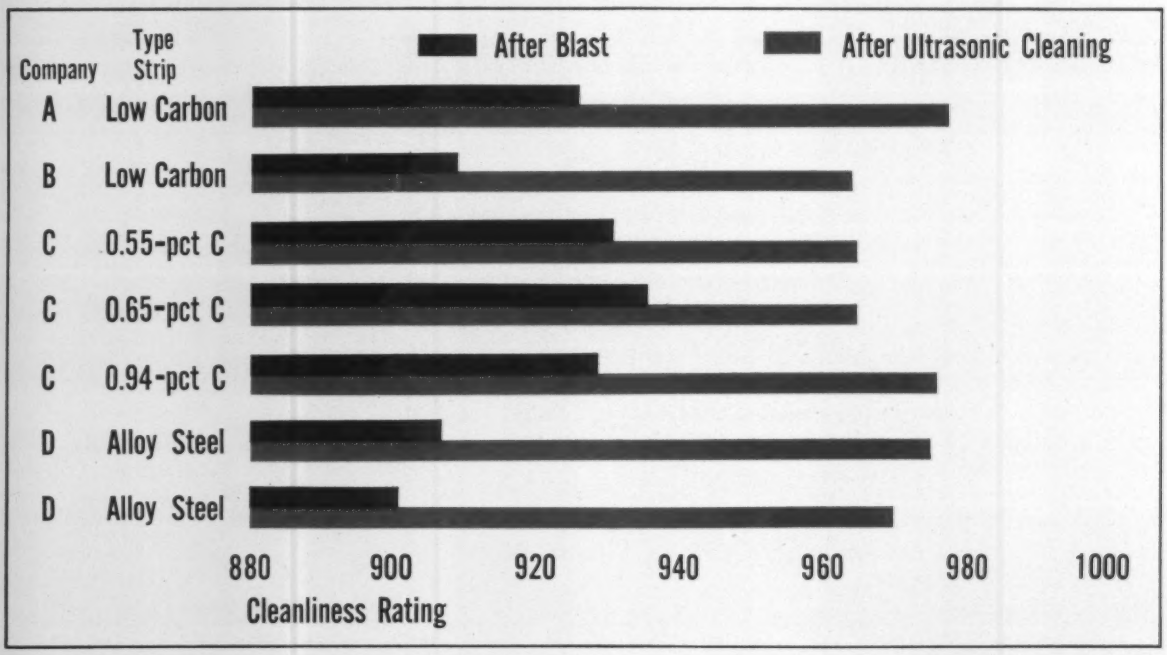
Narrow Channel—Incoming strip passes through a horizontal channel formed by two walls of barium-titanate transducers. The transducers are about 2½ in. apart. There are 16 transducers in the tank.

These transducers vibrate at 40 kc per sec. They use an average of 125-w power with a 500-w peak during pulses.



DESCALED STRIP: Four 75-hp centrifugal wheels hurl a total of 400,000 lb of steel shot per hour. This descales both sides of the strip.

Check the Results of Four Steel Companies



Each transducer in the parallel circuit has a fuse. This setup causes a visual alarm in the event of trouble or breakdown.

To provide cavitation for optimum ultrasonic cleaning action, the banks of transducers have been submerged in a highly-alkaline wetting fluid. This fluid continuously recirculates at 160°F.

There is little or no corrosive problem. There is also no fume removal problem. And there is no problem of acid-solution disposal.

Cooperative Effort — The ultrasonic equipment is made by the Branson Ultrasonic Corp. The tank, structural sections and the materials handling equipment were constructed by The Wean Engineering Co.

Results obtained from the first test series indicate that the ultrasonic bath solves the smudge problem efficiently. A number of coils cleaned by the combination Roto-blast-ultrasonic process are undergoing cold rolling at various steel companies.

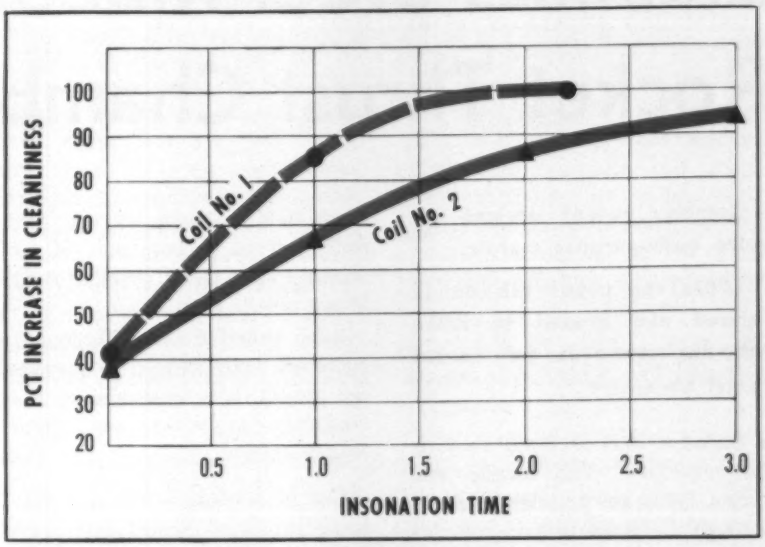
Preliminary work at a line speed of 120 fpm indicate that alkaline cleaning removes about 40 pct of the surface soils. Addition of the ultrasonic energy to the process increases this cleaning activity by at least 100 pct.

The bar chart on this page compares cleanliness ratings for as-blasted strip, alkaline-cleansed strip, and the combined alkaline and ultrasonic cleaning process. Perfectly clean strip is indicated by a rating of 1000.

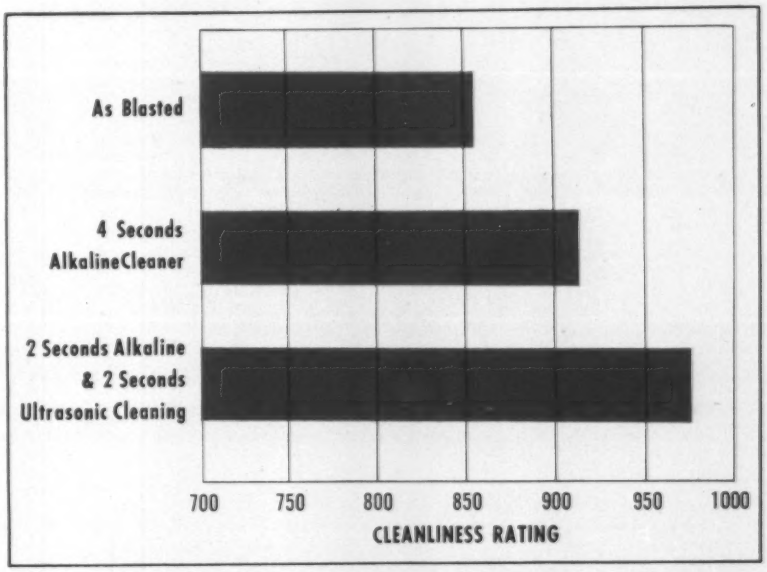
Personalized Cleaning — When heavy soil burdens are encountered, slightly lower cleanliness ratings result. Tests on various heavy soil burdens show that an ultrasonic cleaning setup must be designed to meet the cleaning needs and conditions of an individual production line.

Another method of obtaining cleanliness values is by calculations in the form of a percentage increase.

Soil Burden Alters Results



Compare Cleanliness Ratings



Here's the formula:

$\frac{C_f - C_i}{1000 - C_i} \times 100$ = pct increase in cleanliness

C_i is the initial cleanliness

C_f is the finish cleanliness

The graph presents insonation data on two coils. Note the difference in cleanability. The first coil had a more uniform pattern and was cleaner than its mate prior to entering the cleaning line. This again points out the need for evaluating each cleaning job on the basis of its own requirements.

From the information obtained to date, it appears that ultrasonic cleaning is a logical follow-up to shotblasting operations.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Stainless Steel Ribbon Wraps Rocket Thrust Chambers

Complex rocket designs require multi-purpose metals.

Stainless steel ribbon is formed and brazed to make tube-like passages for rocket thrust chambers.

■ Stainless steel is again showing its versatility. The missile and rocket fields are putting the metal through the paces to gain complex designs for component parts.

The hourglass figure and glistening stainless steel ribbon which would add splendor to any gift package have become part of an unique rocket thrust chamber used to test missile fuels.

Solar Aircraft Co., San Diego, has borrowed both items for a space age project. It is sponsored by the National Aeronautics and Space Administration.

Cut to Ribbons—The hourglass figure has been adapted to a mandrel on which 360 strips of U-shaped 0.008-in. AM-350 stainless steel are fastened and then wrapped with the stainless steel ribbon.

The stainless steel sheets and ribbon are supplied by Allegheny Ludlum Steel Corp., Pittsburgh.

In fabricating the chambers, 360 straight strips of AM-350 stainless steel sheet are blanked out. They are then formed and sized separately into U-channels. This is done in a single operation on a one-piece die representing the angular segment of the engines.

The ribbon-wrap concept, conceived and designed by NASA, applies an entirely new approach involving design, materials and fabrication. It replaces the tube-type regeneratively cooled thrust chambers used on former programs.

The brazed thrust chambers will be used by NASA at the Lewis Research Center, Cleveland, for testing new high-energy liquid propellants. The fuel will require strong rocket thrust chambers to withstand very high heat flux.

Good Conductor — The sheet metal channels provide an easy, yet precise method for controlling coolant passage area throughout the chamber. The channels have been designed to quickly conduct heat from the thin metal. This is done by varying the fuel coolant velocity to meet local heat conditions.

The concept offers an extremely lightweight, yet strong chamber which provides greater design flexibility. Costs are less than other types of construction. Each chamber weighs about 90 lbs including attached hardware. They are designed for an engine thrust range between 13,000 and 20,000 lbs.

In the course of work on the chambers, numerous gains have been made. To name a few: Precision component forming, assembly

HAND FABRICATED—Channels receive about 100 thousand spot welds. They're applied in a specific pattern to insure a close fit and to hold the dimensions needed on the rocket thrust chamber.

methods, electro-grinding, ribbon-forming and stretch wrapping, have come a long way.

How It's Joined — One-hundred eighty channels are assembled on a stainless steel mandrel that has been contour machined to the desired chamber shape. Then 180 more are joined on top of the original channels at the neck of the hourglass chamber. They are then gradually fed into a skirt.

The channels are racked, with the open side facing out, through the use of notched clamping devices. Channels are then welded together with about 100 thousand spot welds. The welds are easily and quickly applied in a specific pattern to insure close fit-up and hold dimensional and design needs.

The assembly is annealed in a hydrogen atmosphere to hot size channels to the exact shape of the mandrel. The chamber is then put on a lathe where the channels are sized and electro-ground to specified heights along the entire chamber length.

Automatic Feed — Precision grinding provides the accurate coolant passage geometry needed for the design concept.

Following the grinding, the chamber is wrapped tightly with 2,650 ft of 0.008 in. thick AM-350 stainless steel ribbon.

The ribbon, along with a copper brazing ribbon, is fed around the chamber from a spool geared to the revolution of the lathe.

Following the wrapping, additional copper braze filler is sprayed onto the chamber to provide external sealing of interlocked ribbons. The chamber is then ready for brazing. This mates the wrapping and channels into tube-like fuel passages.

Special Furnaces—Solar uses one of its large 600 kw elevator-type furnaces with multiple zone control for the brazing operation. This is done in a welded muffle with controlled argon or hydrogen atmosphere. In the brazing cycle, the chamber is taken above 1980°F in one hour.

After brazing, the chamber is slowly furnace-cooled to 1800°F to allow unstressed solidification. It is then removed from the furnace and air cooled to room temperature. Protective atmosphere is maintained to insure a clean assembly.

Multiple brazing techniques are used in the next step. Hardware attachments such as fuel manifold, reinforcing rings and injector flange are fitted to the chamber for the second braze operation.

This takes place at approximately 1875°F. A copper-tin brazing alloy is used in this operation.

Properties Developed—The chamber is then machined to mate the injector and engine mount. The assembly is then heat treated. This is necessary to achieve the desired metallurgical properties of precipitation hardened AM-350. The heat treating is performed in a cycle of −100°F for three hours followed by three hours at 1000°F.

The chamber must then pass a series of leak pressure tests using helium at 200 psi in the fuel passages. The chamber is submerged in a water tank during the test. The lightweight chambers stand about 5 ft high and measure 39 in. in diameter at the skirt, 7.8 in. in diameter at the throat and 10.5 in. in diameter at the head.

The fuel manifold fits around the throat. In operation the fuel enters the chamber passages here and flows down 180 channels to the skirt. It then returns up another 180 channels to the fuel injector at the head.

NEW CONCEPT—The cast mandrel is machine contoured to the desired shape. After the U-shaped stainless steel channels are formed, they are racked on the mandrel, then gradually fed into a skirt.

Nuclear Unit Detects Moisture In Foundry Molding Sand

By H. A. Burley and M. J. Diamond—General Motors Corp.

Moisture in a batch of foundry sand is commonly approximated by tests on small samples.

But a nuclear gage measures the average moisture content of almost the entire batch.

■ A new instrument checks the moisture content of foundry sand. Using a radioactive fast-neutron source, it measures the moisture in a 3200-lb sand charge to an accuracy of ±0.05-pct moisture content at the 3-pct level in less than one minute.

The gage provides safe operation. Nuclear radiations have no effect on the sand.

This instrument was developed by the Physics Dept., General Motors Research Laboratories Warren, Mich., and GM's Central Foundry Div., Saginaw, Mich.

Atomic Energy — The nuclear gage measures the average moisture content of almost the entire batch of sand. This foundry application centers on one of the first industrial uses of plutonium 239, an atom-bomb and nuclear-reactor material.

Plutonium, used in combination with beryllium, generates fast neutrons. Triple seals prevent radioactive leakage. A motor-driven assembly places the radioactive source in the center of the sand. This assembly also contains two slow-neutron detectors.

Briefly, here's how the gage operates. Fast neutrons radiate in all directions from the radioactive source. In the sand, collisions with heavy elements have little effect on the fast neutrons.

Reduce Speed—But, collisions with hydrogen nuclei reduce the neutrons' speed. After a number of such collisions, the neutrons become slow or "thermal" neutrons.

Most of the hydrogen present in the sand is in the form of water. Therefore the quantity of slow neutrons present in the sand is equal to the moisture content. By using a detector that sees only slow neutrons, the output is related directly to sand moisture.

Mechanical assembly of the gage is relatively simple. A large cylinder in the center forms a wax-filled shield and calibration drum. Paraffin shields the fast neutrons in a manner similar to the way lead shields other types of nuclear radiation.

Extending below the drum is a stainless steel access tube. The detector and source assembly travel through this tube. Above the drum is the steel channel which supports the motor and clutch assembly.

Down the Tube—A small motor drives the detector and source down the access tube for moisture measurements. It also drives them back up the tube for calibration or storage in the shield drum. When the desired position is reached, a clutch disengages the motor and a brake stops the assembly.

The long pipe above the drum houses the coaxial cable that carries the signal from the neutron detectors to the nuclear-counting device. A small steel rod in front of the drum forms part of the interlock unit. Two locks are provided, one at the top of the drum, the other at its bottom.

When the lock at the bottom is removed each morning by the operator the source can be moved down the access tube for normal operation. The lock at the top is removed only for inspection and maintenance.

Initial Installation—One of these gages has been installed on a sand system at the Danville Plant of Central Foundry Div. Sand that en-

OPEN DRUM: Skilled technician lifts the source and detector assembly. The lock at the top is removed only for inspection and maintenance.

ters the storage bin is diverted from one of the main flight belts.

Electric vibrators feed the sand into the weigh lorry. When 3200 lbs of sand enters the lorry, the electric feeder shuts off. The same relay starts the moisture gage.

The pointer on the computer and the electronic and mechanical counters of the nuclear scaler are all set to zero. After a slight pause, the scaler starts to count. At the same time a timer motor starts turning the indicator.

When 100,000 neutrons have been counted, a relay in the scaler interrupts the power to the computer motor. The pointer at this time indicates the moisture content of the sand in the weigh lorry.

Variable Arc—If the sand is very moist, the slow neutrons enter the detectors at a higher rate and the timer motor turns through a small arc before the 100,000 slow neutrons are counted. With dry sand it takes longer to collect the counts. Thus, the pointer turns through a greater arc.

The timer dial is read in terms of moisture content. In addition, the dial indicates on a parallel scale the amount of water needed to bring the sand up to the desired level.

After the moisture measurement has been made, the operator presses the dump button. The sand falls into the muller. The electric feeder starts filling the weigh lorry again and the cycle continues.

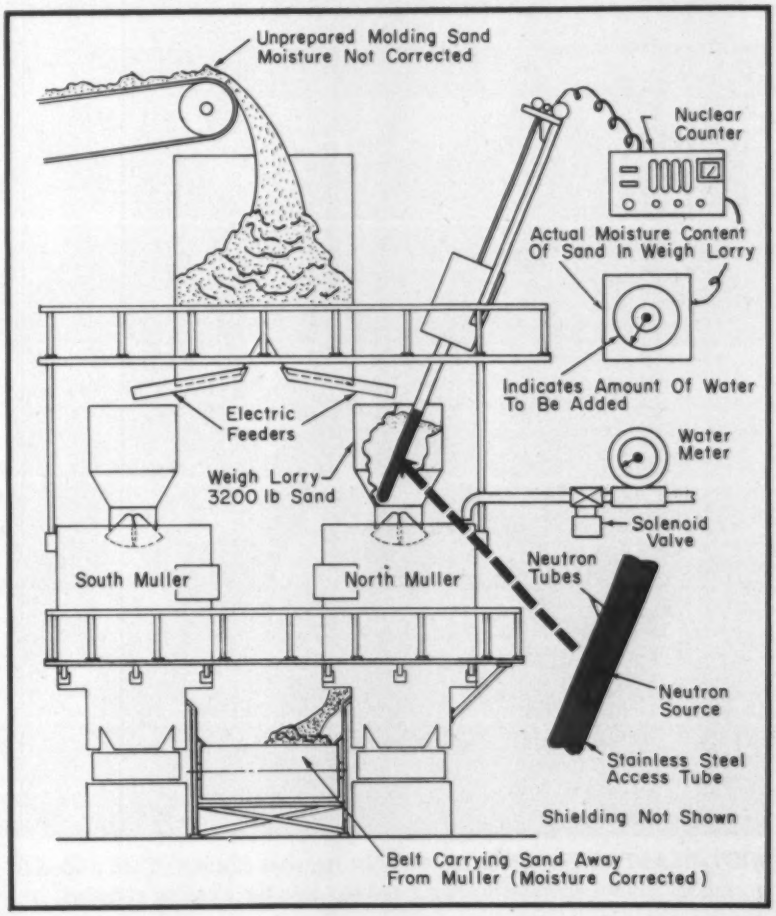
Correct Moisture — Meanwhile, the operator presses the water feed button long enough to meter out the amount of water indicated on the computer. This brings the moisture content of the sand being mixed in the muller up to the desired level. Certain binding materials are also added to the muller.

After a preset time, it dumps itself onto the outgoing vibrator. All sand then goes over to the casting line by an elevator and belts.

Film-badge and survey-meter results prove that the system is completely safe—as long as the source is inspected regularly.

FULLY SHIELDED: Platform supports the nuclear scaler, drive motor's control cabinet and storage drum. Paraffin shields the fast neutrons.

Water Slows Neutrons' Speed



Conveyors Link Free Tracks To Move Huge Castings

Many railroad castings are big, bulky and hard to handle.

With side-by-side conveyors, a new system speeds parts weighing up to 930 lb. It also stores 300 in-process castings.

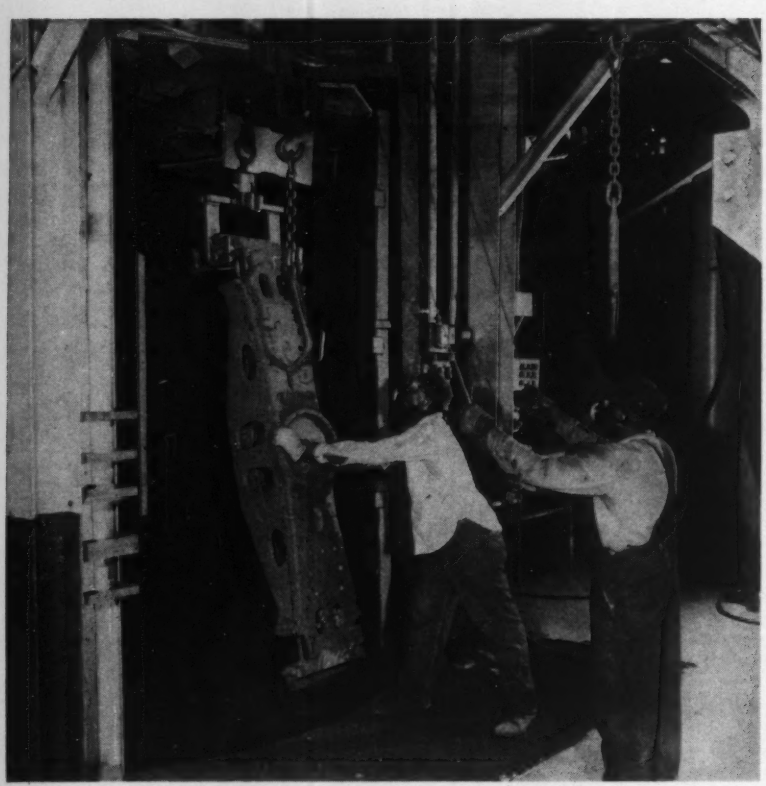
▪ Straight-line processing eliminates multiple handling in a heavy casting plant.

One of the world's principal manufacturers of railroad castings, the Scullin Steel Co., St. Louis, uses a "power-and-free" conveyor system to reduce production costs.

Designed by the Link-Belt Co., Chicago, the system consists of a free track that connects all processing stages. Three powered conveyors move castings along the free track from annealing to storage. They also convey castings from storage to shot-blast operations and then to the unloading area.

Speed Control—The free track divides into four parallel cooling and storage lines. Switching devices at each end—with retarding conveyors—control the castings speed.

A powered conveyor engages trolleys and carriers on a free-rolling monorail. It moves them to a point where they can roll by gravity or be pushed to work stations or storage areas.



SHOT-BLAST CLEANING: An air hoist removes castings. Then a special work hook allows operator to swing castings into the cleaning chamber.

The conveyor unit provides—in one integrated system—all the advantages of both powered trolley conveyors and free-rolling monorails. Coupled with these advantages is any desired amount of automatic control.

The system at Scullin utilizes a side-by-side type of conveyor design. Two sets of trolley tracks are arranged alongside each other. Both tracks suspend from common supports which handle castings with a maximum weight of 930 lbs. The supports provide storage for 300 castings.

Smooth Flow—Operations begin when castings are received from the core knock-out stage. After all gates and sprues are removed they move to a work station where other excess metal is removed.

Then, they're placed on furnace cars that move through the annealing furnace. The annealing cycle varies depending upon the casting size and weight.

Castings loaded onto the conveyor system are hot. But they don't exceed 350°F. After rough cooling, an air hoist mounted on a jib crane places them on a four-wheel trolley assembly of the L-B conveyor unit.

Workers push castings along the free track until the free trolley engages with the powered trolley's pusher bar. This forms an inclined pusher conveyor that elevates the castings to the highest point in the system—about 15 ft above floor level. Switches sort the castings into any one of four storage lines.

Suits Rush Work—This permits shot-blast work on any casting, regardless of the order in which it enters the system from the annealing furnace.

Casting rates require a large storage area. Accumulated tonnages of over 250,000 lb must be supported.

Handling System Speeds Parts

The conveyor system fulfills this demand. It also permits loading of the storage banks at a rate other than the rate of unloading.

Annealed castings enter storage even when shot-blasting is stopped for a limited time. This precludes the interruption of either operation.

Controls Velocity — In view of the weights that rest on the conveyor, heavy castings entering the storage area have to be controlled to prevent their gaining speed on the gravity run. For this purpose each storage conveyor has a retarding-chain conveyor.

Operating on 132-ft centers, these units control the castings speed and travel limits on the free run. Maximum speed is 10 fpm.

Each chain uses retarding dogs. The dogs allow a gentle accumulation of castings at the stops.

Retarding chains consist of rivetless chain. The retarding dogs are hinged. These dogs pass over load bars at the discharge end of the track, where castings accumulate.

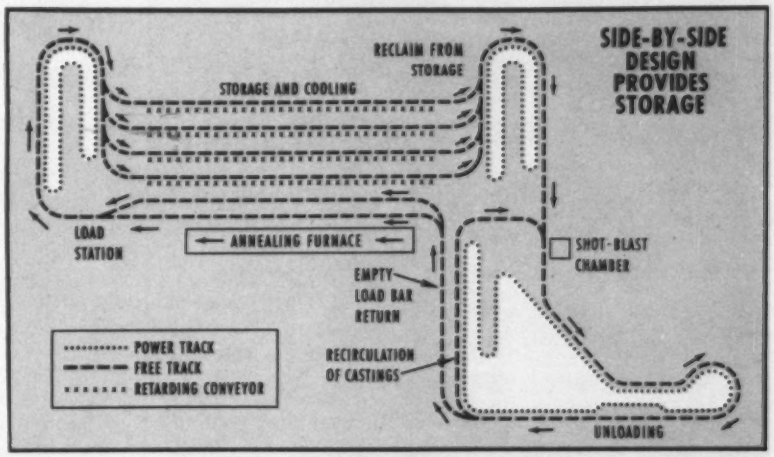
After cooling, the shot-blast operator sends castings to the powered conveyor line. He controls switching at the cleaning unit. Limit switches control castings on the powered line of the system.

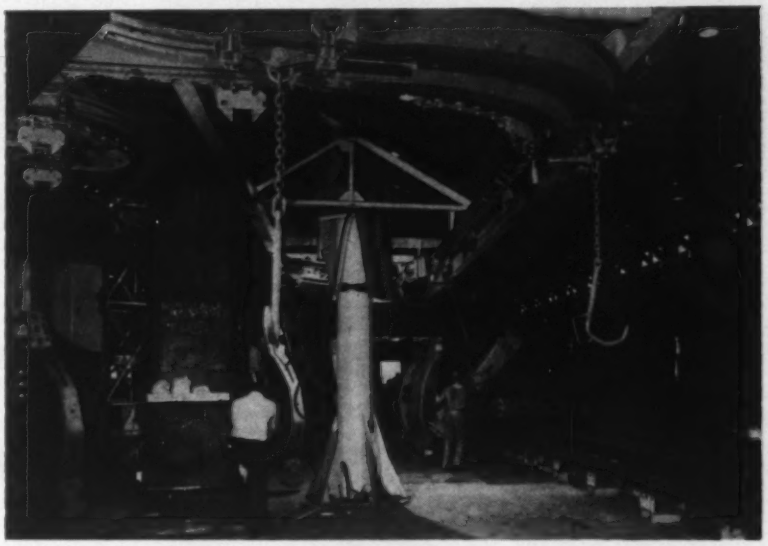
Shot - Blast Cleaning — At the shot-blast cleaning chamber, an air hoist on a tilting-boom crane removes castings. This hoist transfers each casting to the work hook within the shot-blast cabinet.

The three - station machine indexes each casting 120° for initial shot-blasting. It rotates the part 360° during the cleaning process. Then it indexes another 120° for visual checks.

At this point, if it's needed, further cleanup can be done at a manually operated shot-blast station. In such a case, the casting again indexes 120° for removal from the chamber.

After shot-cleaning the casting transfers back to the trolley-conveyor load bar. It's manually pushed to make contact with the powered line. As it conveys to the unloading area, it's removed from the load bar and placed on heavy stands. An overhead crane moves the stands—and the castings—to the finishing department, where work is completed.





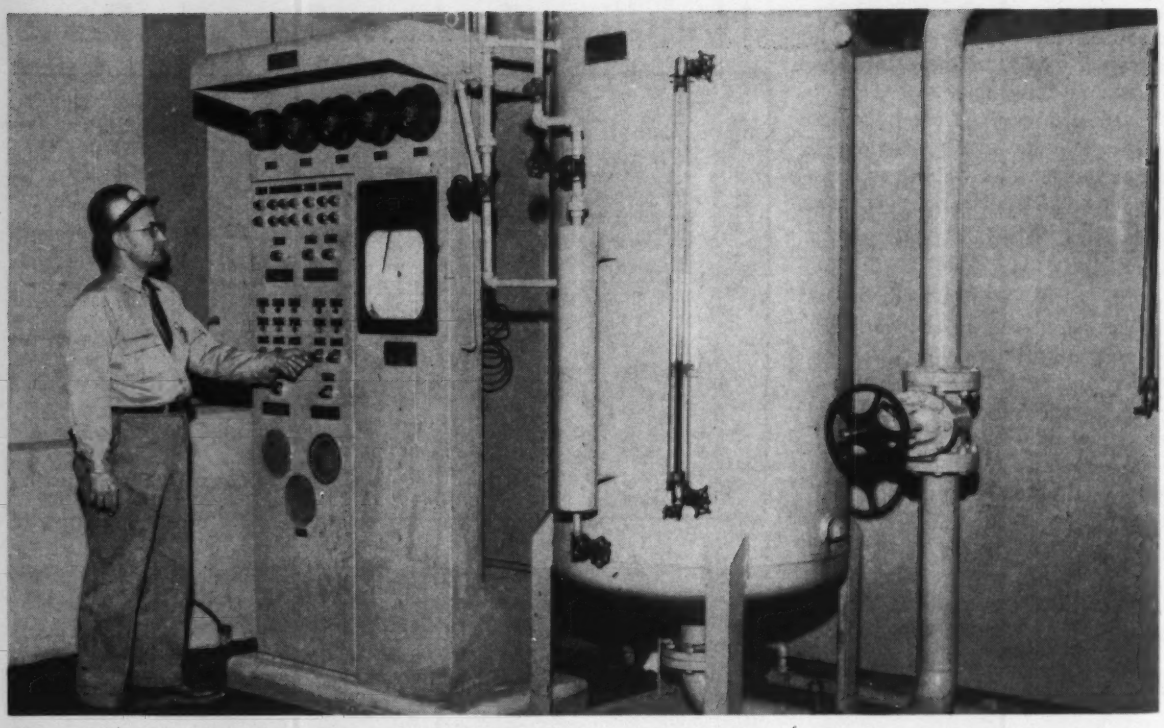
FINISHED CASTINGS: Cleaned castings are removed from the conveyor. They await final inspection. Rejects return to rework stations.

Automatic Diversion — Empty load bars return on the free track to either of two lines that parallel the annealing oven. A limit switch controls trolley entry to these storage lines. When one line is filled, the switch diverts trolleys to the other storage line.

In storage, the trolleys move by gravity to the load point. At this point, castings are removed from the annealing oven.

Flexibility of the installation is enhanced by a recirculating conveyor. This conveyor is used for improperly cleaned castings and "blowbacks."

Rejected work automatically returns from inspection stations to the shot-blast chamber and rework stations. Rejects don't pass cooling and storage. The powered conveyor also permits return of empty carriers to storage ahead of load stations.



LOOKING AHEAD—Lubricating engineer Robert Cottrell, Sheffield Steel Div. is alternating main and spare pumps to even the wear on them. Pumps insure pulsation-free flow at high operating speeds.

How Centralized Lube System Cuts Maintenance Costs

Preventive maintenance can best be established by understanding the equipments' lubrication problems.

Properly-designed lubrication systems keep machines operating even under the heaviest of work loads.

■ Preventive maintenance is always a subject of much concern to the factory managers of today's modern plants. Work stoppages due to machine downtime cannot always be justified. This is often the result of underdesigned lubricating systems.

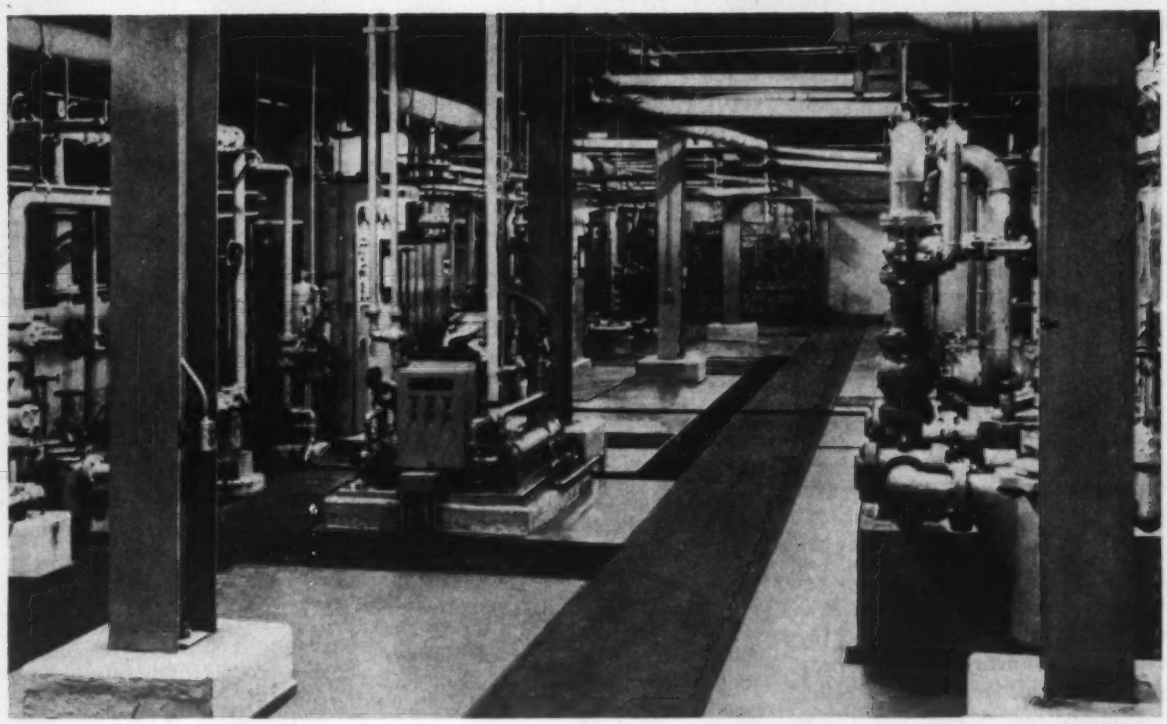
Systems are available which will eliminate machine lubricating problems. By considering the utility of the overall system, maintenance costs can be greatly reduced.

The preventive maintenance benefits are of two kinds, according to leading lubricating engineers. First are the elaborate built-in safeguards against system failure. These include the dual reservoirs and twin filters, as well as alarms and trouble indicators.

Look Ahead—The initial cost may be higher when, for example, dual reservoirs are installed, but it pays off in the long run. Robert Cottrell of Sheffield Div., Armco Steel Corp., Kansas City, referred to a costly five-hour shutdown of a 12-in. mill at his plant. The cause was traced back to the lack of a by-pass system available with dual tanks.

The second kind of preventive maintenance benefit is derived from the overall design of the system. This provides for a clean, compact setting of all equipment and controls. It will require minimum attention by the maintenance force and generate maximum pride in upkeep of the oil room.

Prime Example—One of the fastest three-stand 10-in. rod mills in the world, Sheffield's 23-stand mill has a rated capacity of 60 tons per hour and rolls at a speed of about 75 mph.



NEAT AND COMPACT—A clean oil room is the result of thorough planning. Proper layout requires very little attention by the maintenance force. Rubber mats cover walk areas and drain trenches add to cleanliness.

Its main purpose is to produce competitively priced, high quality finished rods for reinforcing and wire rope, and to increase output of wire mill, bolt and forged products.

These high speeds and tremendous pressures result in high heat generation which throw critical burdens on the lubricating systems. Close temperature and pressure controls are vital. Lubrication systems no longer perform just a routine role in design. They are treated with full respect to the needs.

Proper Action—To meet lubrication demands on Sheffield's $10 million rod mill, Dravo Corporation, Pittsburgh, was called upon to fabricate and furnish five custom-designed lubricating systems.

The five systems, circulating a total of 45,200 gal of oil at 556 gpm, involve five changes in viscosity and two major changes in pressure. According to the mill, roughing, intermediate, looping, finishing train and components each need lubricants of specific viscosity.

In almost every component, preventive maintenance assets develop logically or have been specifically engineered to that end. These are some of the major features and their functions.

Check Your Needs—Dual reservoirs help extend the service life of the oil. The spare tank provides the opportunity to settle out water and contaminants, while the system is in operation using oil from the main tank.

Sloping tank bottoms permit direction of water to oil purifier connections. Each of the ten tanks has steam heating coils controlled by two different temperature controls. One control is used for normal operation, the other for use when the tank is by-passed and temperatures are raised to assist settling.

Coolers for each system remove over 3 million Btu per hour. To assist the maintenance function they are mounted on monorails. Piping is arranged to permit easy lowering to the floor for cleaning.

Special pumps insure pulsation-free flow at high operating speeds. Providing near-perfect quiet in the oil room, they make a useful psychological boost to maintenance work. Filters have double basket strainers. When one filter becomes dirty, an alarm sounds and oil is diverted to the alternate strainer while the first is changed.

Warning System — Controls are located on the mill floor. The main signal control panel contains 116 individual indicator lights. The system control panels automatically locate trouble points in the lubrication system at any point in the mill, and warn mill operators.

Also, a total of 121 pressure gages indicate where pressure readings must be taken to insure that lubricant is reaching key points.

Special evalutions should be made of your lubrication needs. They may not be as detailed as this example but preventive maintenance depends on their consideration.

Quality Control Gets Assist From Automatic Gaging

Do your quality control programs tend to get too complex?

Then automatic gaging might be just the thing to lighten the load. That's what it did for this truck engine plant.

By R. H. Eshelman,
Machinery Editor

■ In many metalworking plants, part inspection takes the form of an afterthought. Parts aren't tested for the desired quality until they come off the production line. As a result, scrap and rework problems start to mount.

A more modern way to make efficient use of quality control is to insert inspection right into the production program—100 pct of the time. In the long run, such a method is more effective and far less costly.

According to P. McNeil, Assistant Chief Engine Plant Inspector of GMC Truck and Coach Div., Pontiac, Mich., the manufacturer should not lose sight of one basic goal: Give the customer a quality product. He points out that this effort starts in design. But, since no company has a monopoly on engineering talent, any marked advantages in design are likely to be temporary.

Key Is Quality—From the user's viewpoint, product differences often boil down to overall quality. To market the product envisioned by the engineer, then, you must plan along with him. You must build quality control into the manufacturing program from the very start.

Mr. McNeil notes many advantages from automatic, in-line gaging. This tally is based on production experience with the new V-6 and V-12 engines. Results at GMC are paying off, regardless of the size variation of runs or the product mix.

One of the big features of automatic gaging is that it enables you to produce products within the drawing specifications most of the time. But Mr. McNeil warns, "You must start with good equipment capable of doing the job."

Of course, quality control is just wasted if the material isn't the best available. You cannot produce a quality product from defective material.

Flexible Line—In GM's modern engine plant much of the machining is performed on transfer lines. Sound plant engineering and machine design combine to permit a family of parts to be handled at one time. Both V-6 and V-12 blocks, for example, run down the same line.

SPOT CHECK: With the aid of automatic air gages, the operator can check a V-6 engine block from the transfer machining line. Statistical charts show the status of blocks at this stage of production.

Equipment is flexible for quick changeover.

This same idea is applied to gaging. It remains flexible, too. For proof, look at the plant's engine block or "dog-house" air gages. Each one is set up at key spots on the line. They can be moved around to various stations to pinpoint trouble spots.

Inspectors use these gages to make quick checks on blocks during machining. Provisions have been made at key points in the line to switch off parts for quality tests.

Comparison—This system is no substitute for statistical quality control. It just makes the job that much simpler. The plant makes use of the usual average and range (X-bar and R) charts and C charts. And they're often used with automatic-type gages.

As a result, there's little time lag in determining how close you are to the danger point. It also signals more rapidly how many pieces of scrap are being made per operation and what action should be taken.

Engine block air gages are very useful on the main machining line. They quickly check that all operations up to that point are on the beam. This includes checking the relation of holes, faces and surfaces.

Check Points—There are several locations that are checked. Among them are after-broach, semi-finish of bores; after-machining tapped holes; cam machining station; and end of machining line.

Describe the setup that checks cylinder bores on the V-6 engine block and you really get into automation. Here, the bores are electronically classified, gaged and marked.

The setup checks three bores in one bank for size, taper and out-of-roundness. It then classifies each one into one of six steps of 0.0003 in. After checking, the unit stamps the size classification on the head face.

Round It Goes—As soon as one bank is finished, the block indexes 180° so that the other bank can be checked, too. Interchangeable tooling permits the gage to be used on all three bore sizes. Tools can be changed in 20 minutes or less.

As soon as an out-of-tolerance dimension is spotted, the block is ejected from the positioned gage, then removed from the line. And the gage can handle 67 blocks per hour.

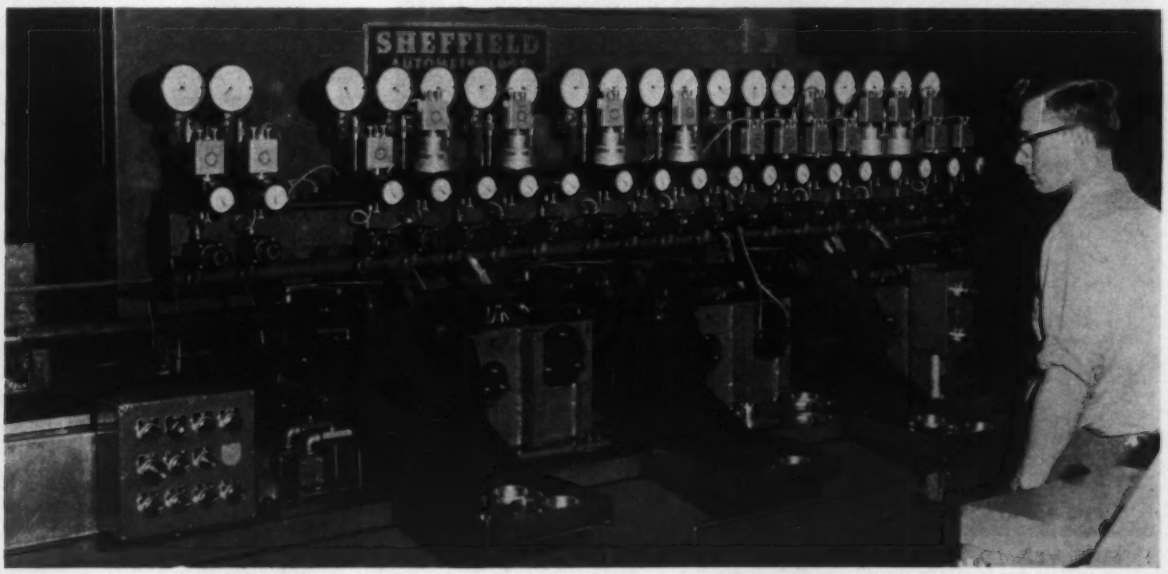
The V-6 blocks transfer down the line. They then move into the gage. Each block is automatically located in position with shot pins. It's then clamped. The operation will only start if the block has been properly located.

Electronics—Three spindles with electronic sensing heads come down and traverse the length of the bores. When they reach the bottom, they rotate 180° to check roundness. A diameter size impulse is then fed into a memory circuit. This is compared later with a diameter reading at the top of the bore as a check on taper.

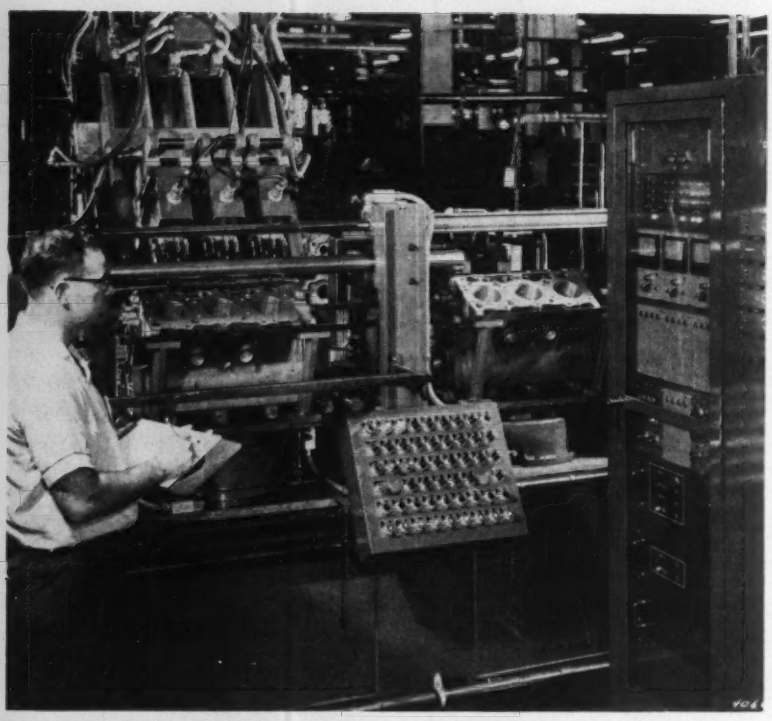
Out-of-roundness is also checked. Proper size is selected and the class number is marked on the head face of each bore. Automatic counters record the number of bores of each size group that passes through the gage.

In this way, piston output is adjusted to actual current needs. It saves time, storage space and part handling.

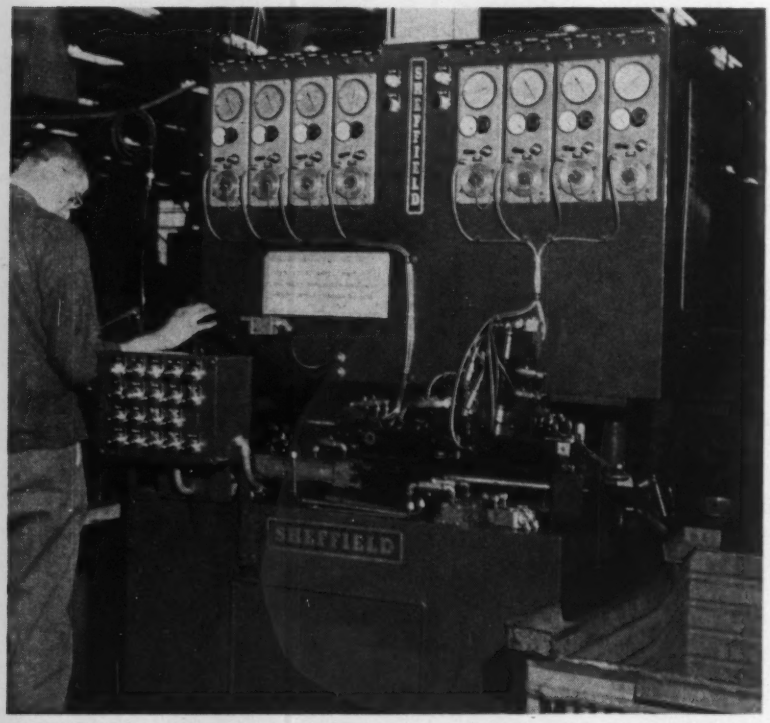
Connecting Rod — The engine plant finds that automatic gaging



FOUR-STAGE GAGE: Connecting rods get through inspection for twist condition as well as dimensional control on automatic air gage. Another function of the air gage is the segregation of defective pieces.



SENSING DEVICE: Electronic block gage inspects cylinder bores, classifies and stamps them, then removes off-tolerance blocks from the line. Dials on the panel also give visual read-out of dimensions.



INTRICATE JOB: Rocker arm gage is used to inspect tricky parts for presence of oil hole. The gage also checks the bore and the radius pad. Rejected parts are segregated either into reject or re-work tubs.

pays off in a number of other key spots, too. Inspection of the connecting rod assembly is a good example. Here, parts are fed in by hand. But gaging and segregating are automatic.

In the four-station gage, pin and crank ends are weighed separately. The machine also gages for bend and twist, thickness of crank and pin end, squareness of hole to face, parallelism, taper and roundness of bore, and size of pin and crank holes.

Out-of-tolerance parts eject at each station. The operation can handle up to 1200 pieces per hour.

Tough Part—A rocker arm is a difficult piece part to check because of its shape. Even though the part is small, it's the kind that can give trouble. Automatic gaging has ended this bottleneck, though.

Parts are fed into the machine by hand. But, from then on, the operation is automatic. The steps include gaging shaft hole for size, roundness and taper. Next comes a vital step: Checking for presence of oil hole. The radius on the pad of the rocker arm is then gaged, as is the location of the pad itself. Discarded parts are segregated into reject and rework tubs.

Word to the Wise—The warning signal lights up as soon as scrap and rework begin to mount. Then the costs of inspection and quality control go up, too. Before you know it, your production troubles become deep seated. But by making quality control an integral part of production, lines will flow more evenly.

This modern approach enables a company to build process controls into the production scheme. In the long run, it's simple and effective. And far less costly than constant trouble shooting.

To sum up, this is the type of job where 100 pct inspection really pays off. What are the results? You get parts that are closer to drawing specs. Also, there's less salvage and rework. And those border-line cases are eliminated. They're the ones that are likely to spell trouble later on.

Hard Facing Saves Valve Seats

Five-Spindle Machine Reclaims Corroded Parts Faster

Corroded parts won't stay in service very long.

Manual hard facing can bring them back. But automatic hard facing can bring them back that much sooner.

■ Very often a corroded part can be completely restored through hard facing. In so doing, the part goes back into service at a fraction of the cost of a new part. Another factor is the speed with which the part can be returned to duty.

A five-spindle hard-facing machine provides such speed for Okadee Co., Chicago. Here, both production time and overall costs are being reduced. Costs, in fact, have been halved.

Automatic hard facing is a common weapon in the war against wear problems. But, in most cases, the surfaces are deposited by arc-welding. The machine at Okadee, however, is more unusual. The deposits are applied by oxyacetylene welding. And the operation is automatic.

A Cobalt Base—This machine is being used to apply new surfaces to valve seats and disks from two cobalt-base alloys. These same parts are later exposed to such effects as corrosion, erosion and wire-drawing action.

Five stations are built into the mechanized hard-facing unit. And the stations take care of preheating, hard facing, postheating, cooling and loading. Under the new setup, Okadee can hard face 30 valve seats per hour. Only 16 seats per hour could be hard faced using the manual method.

Tough Environment—The hard-faced valve seats and disks are used in ¾-in. gate valves that control the flow and pressure of many materials. Some of them are butane, propane and steam coke ovens. In such surroundings, the parts are often exposed to temperatures up to 800°F and pressures of 720 psi.

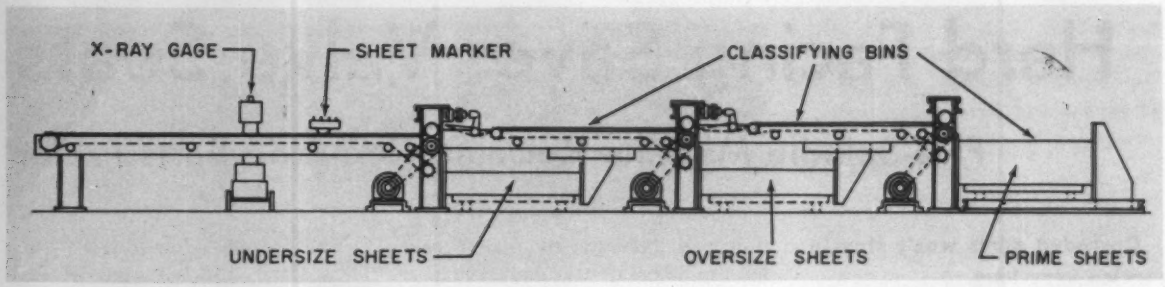
Seating surfaces of valve parts are grooved out, then hard faced with a 3/32-in. thick deposit of either Stellite No. 1 or 12. Both of these wires are made by Haynes Stellite Co., Div. of Union Carbide Corp., Kokomo, Ind. The same company also designed and built the five-station machine.

In the hard-facing setup, 3/16-in. diam bare cast rod is used in 3-ft lengths. Each deposit is finished to a depth of 1/16 in. and lapped within one-third of a light band.

End Result—How do the surfaces stand up? No signs of seal failure have been noted after undergoing 269,000 cycles of operation with propane. The deposits also provide bubble tightness. This is a requirement in these ½- to 10-in. non-lubricated carbon steel valves. Brinell hardness must be 430 for the valve seats and 490 for the disks.

Mechanized oxyacetylene hard facing offers close deposit control with the least amount of dilution. Another advantage is, of course, fast production. You also deposit less hard-facing alloy than required in manual techniques. Since the deposit is closer to the desired depth, less grinding time is required. also.

GOOD AS NEW: A new cobalt-base alloy surface on carbon steel valve seats helps put vital parts back on the line. Aided by a five-spindle hard-facing machine, the process cuts production time and costs.



AUTOMATED UNIT—This typical sheet classifier line uses X-ray gage control to sort and seperate sheet stock.

X-Ray Gage Sorts Sheet Stock

Unidentified sheet stock piled in the store room is sometimes a problem.

Sheet sorters are designed to end these troubles.

▪ Start with a stack of unclassified sheets of widely-varying thicknesses. Next, as fast as an automatic feeder can lay them on a single conveyor; and as rapidly as the conveyor line can move them, perform the following: Classify the sheets in a number of different gage ranges. Mark each individual piece with its gage number and stack them all by gage as desired.

A Tall Order?—It's one filled as daily routine on a X-ray sheet classifier line. The automated method does away with the conventional process of hand checking and stacking the sorted sheets. The units speed output and save operator time which directly cuts costs.

Key to the System — The first stage in the sorting line-is an X-ray gage which monitors the thickness of sheets on the conveyor. The X-ray gage, acting as an electronic micrometer, emits sheet-measurement signals. This in turn activates servomechanisms to mark the sheets and sort them into stacking bins.

Makes Its Mark — A marking device, placed downline from the gage, is pneumatically activated to imprint the proper gage number on the sheets.

The sorting bins are positioned beneath the conveyor and arranged to stack the sheets in any one of six different thickness ranges.

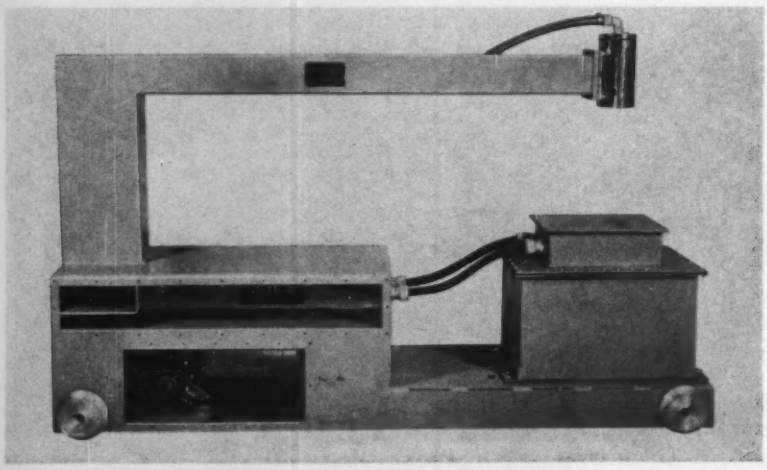
Flap gates along the conveyor line are arranged to open individually upon signal from the control unit. Each sheet slides under the proper flap and drops into a self-stacking bin.

The X-ray equipment was designed and manufactured by Daystrom, Incorporated, Weston Instrument Division.

How it Checks—The gages use an X-ray source to beam a pencil-thin ray of energy. An X-ray incident unit is also used to detect the amount of energy transmitted through the sheet. The signal of the gaging units is interpreted by the console. This in turn sends out impulses to the marking unit and to the required bin gate.

The marker stamps the appropriate gage number several times on each sheet within a space of little more than a foot.

Before running the line, the operator merely selects the thicknesses desired for each of the bins by setting a series of dials on a control panel. The system does the rest.



ELECTRICAL BRAIN—The gage is mounted in a C-yoke with the X-ray pick-up unit in the upper head. The source is in the box below.

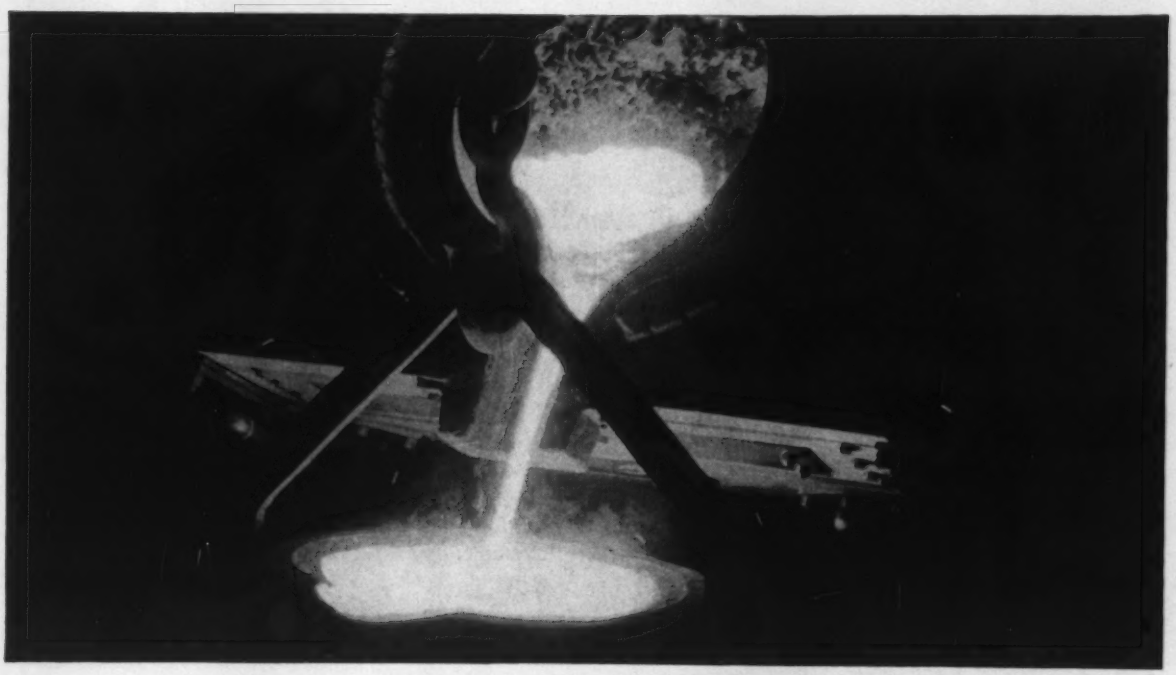
Add life to linings...

Norton MAGNORITE* fused magnesium oxide ramming mix rams easily to high uniform densities that provide extra long service life. Careful grain sizing minimizes segregation. Use wherever high refractoriness, inclusion-free melts, and low outgassing are "musts". Ideal for high frequency melting of alloy steels and high temperature alloys containing nickel/cobalt base; vacuum melting, etc. Proved performance record, in furnaces of all sizes.

Rammed Weight	172 lbs./cu. ft.
Grain Sizing	6F and finer
MgO	91.3%
Al_2O_3	5.2%
CaO	1.7%
SiO_2	1.5%
Fe_2O_3	.2%

For full information on ramming, sintering, etc., write NORTON COMPANY, Refractories Division, 205 New Bond Street, Worcester 6, Massachusetts.

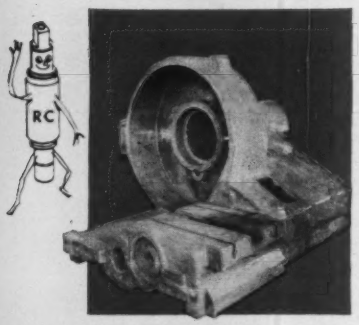
*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



NORTON
REFRACTORIES
Engineered... R... Prescribed

75 years of... Making better products... to make your products better

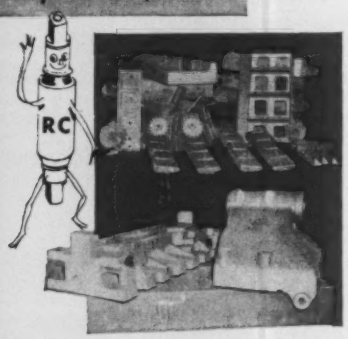
NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



Gray Iron and Alloy Iron Castings

RED CIRCLE Rolls ALLOY-CHILLED

Up to 80,000 Pounds



Our foundry and machine shop facilities are equal to any of your requirements.

Furnace Castings
Machinery Castings
Heavy Die Castings
Heavy Tool Castings
Slag Pots — Bases
Housings
Floor Plates

Hyde Park
FOUNDRY AND MACHINE CO.
HYDE PARK
Westmoreland County, Penna.

Rolls
Rolling Mill Equipment
Gray Iron Castings

PATENT REVIEW

New Patents In Metalworking

Metallic Coating

Coating iron and its alloys with magnesium, D. S. Chisholm (assigned to Dow Chemical Co., Midland, Mich.), May 3, 1960. In the coating of steel with a continuous adhesive layer of magnesium metal, the steel is immersed in a molten fused halide flux composition on which a layer of molten magnesium is floated. Titanium tetrachloride gas is passed through the flux and into the molten magnesium, while positioning the steel surface so that it is contacted by the rising gas. No. 2,935,421.

Scale Prevention

Prevention of scale formation on castings, C. Shaw (assigned to Shaw Process Development Corp., Port Washington, N. Y.), May 10, 1960. To prevent scale formation on ferrous alloy or other metal castings in a mold, a layer of solid hexamethylene tetramine is placed on the metal in the riser. The mold is enclosed, and the heat of the metal volatilizes the coating compound to form gasified hexamethylene tetramine. No. 2,935,772.

Moisture Control

Method and apparatus for automatically measuring and controlling mixture in a sinter mix or the like, M. J. Greaves (assigned to Arthur G. McKee & Co., Cleveland), Apr. 5, 1960. In the automatic and continuous measurement and control of the moisture content, in a sinter mix that is supplied to a sintering machine, the moisture in the stack gases is measured and correlated with other operational variables. A computer system determines and regulates the addition of water to the mix. No. 2,931,718.

Low Impurity Content

Process for production of high-grade cast iron, F. Klepp and R. Werner (assigned to Vereinigte Osterreichische Eisen- und Stahlwerke A. G., Linz, Austria), May 17, 1960. In the production of high-grade spheroidal or nodular graphite cast iron, the usual charge is melted in an acid cupola furnace. It is then blown with oxygen or oxygen-enriched gas in the presence of a basic slag, whereby the silicon content is lessened. The phosphorus content is lowered during the blow by adding to the bath iron oxide, lime, and sodium carbonate. No. 2,937,084.

"Patent Review" appears in the third issue of The IRON AGE each month. Look for it in the July 21 issue.

Furnace Lining

Method of lining furnaces, E. L. Arnold (assigned to A. E. Anderson Construction Corp., Cheektowaga, N. Y.), Apr. 26, 1960. Method of lining blast or other metallurgical furnaces. The upper and lower sections may be lined at the same time, with minimum risk of damaging the refractory units used. No. 2,933,-918.

New Heat Treatment

High - strength steel, D. J. Schmatz, J. C. Shyne and V. F.

Zackay (assigned to Ford Motor Co., Detroit), Apr. 26, 1960. Process and heat treatment for manufacturing steels having a very high tensile strength and a high ratio of yield point to tensile strength. The suitable steel alloy is heated, quenched in a molten lead or molten salt bath, worked, water quenched into the martensite transformation zone, and tempered. No. 2,934,463.

Alloy Resists Heat

High-temperature bearing alloys, L. V. Klaybor, P. R. Borneman and D. L. Byrne (assigned to Allegheny Ludlum Steel Corp., Brackenridge, Pa.), Apr. 26, 1960. A heat-resistant iron base alloy, characterized by high hardness, strength, and oxidation resistance, comprises about 0.72 pct C, 0.24 pct Mn, 1.04 pct Si, 11.63 pct Cr, 5.29 pct Mo, and the balance substantially all Fe. No. 2,934,430.

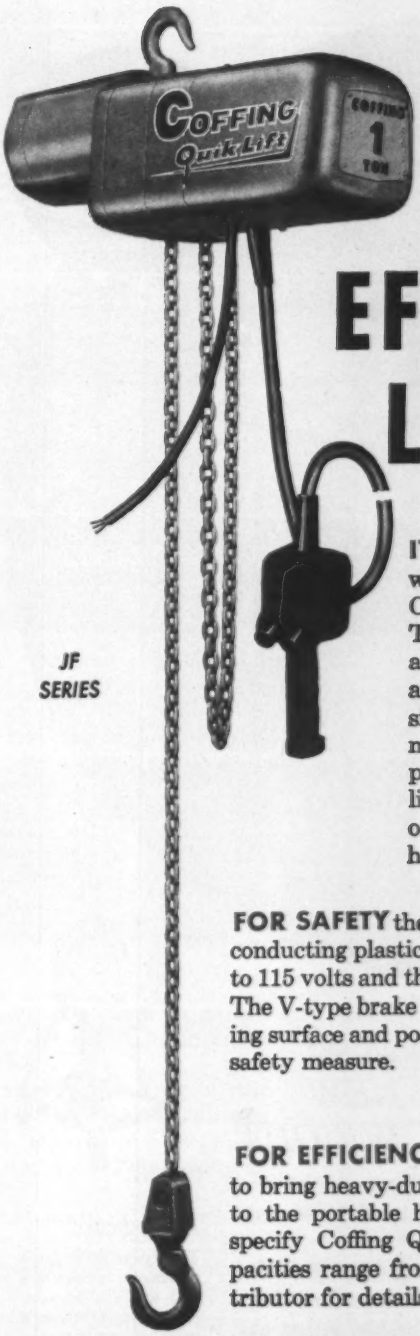
Machineable Welds

Hard surfacing weld deposit for cast iron, R. F. Sherwin (assigned to Chicago Hardware Foundry Co., North Chicago, Ill.), May 17, 1960. An improved cast-iron welding rod produces machineable, non-cracking weld deposits. The rod comprises 3.4-3.5 pct C, 2.5-3 pct Si, 0.6-0.75 pct Mn, 0.15-0.45 pct P, 0.1 pct maximum S, 0.6-1.5 pct Cu, 0.2-0.4 pct Cr, 0.3-0.5 pct Mo, and the balance essentially all Fe. No. 2,937,083.

Magnetic Alloy

Magnetic products of high aluminum iron alloys, D. Pavlovic and K. Foster (assigned to Westinghouse Electric Corp., E. Pittsburgh, Pa.), May 17, 1960. To improve its magnetic properties, an aluminum-iron alloy sheet is heated at 800-1200°C in the presence of air. Then it is quenched to about room temperature to suppress ordering transformation. No. 2,937,115.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.



JF SERIES

EASY SAFE EFFICIENT LIFTING!

IT'S EASY to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The pistol-grip control station and the combination strain cable and control cord makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

FOR SAFETY the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety measure.

FOR EFFICIENCY this hoist has been designed to bring heavy-duty performance plus durability to the portable hoist field. It will pay you to specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

COFFING HOISTS

DUFF-NORTON COMPANY

COFFING HOIST DIVISION • Pittsburgh, Pa.

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

Time *can be saved with the heavy-duty NEW ISO-SEAL® LEGAL WEIGHT crane scale*

The load will be accurately weighed *as* it's moved, saving you time and money.

THE NEW ISO-SEAL® CRANE SCALE is the most accurate crane scale on the market. It is more sensitive and yet more durable. It has accuracy you can SEE—because the dial (16") has large, easy to read graduations. You get guaranteed, legal weights with the Iso-Seal® scale because it meets all requirements of Handbook H-44 of the National Bureau of Standards.

5 Capacities from 6,000 lbs. to 30,000 lbs.

This scale has been approved by States' Bureau of Weights and Measures as legal for use in trade.

CRANE SCALE ACCESSORY

This crane dolly gives maximum protection and mobility to your ISC scale. Strongly made of angle steel—has 4 hard rubber swivel ball-bearing casters.

Send for brochure and name of dealer nearest you today

JOHN CHATILLON & SONS

85 CLIFF STREET, NEW YORK 38, N.Y.

Manufacturers of Scales, Force Measuring Instruments and Precision Springs Since 1835

FREE LITERATURE

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 141.

Tool Steels

Specifically developed for the cold-heading industry, a water-hardening vanadium-alloyed tool steel is described in an eight-page pamphlet. It gives detailed information on forging, stress relieving, hardening, tempering and annealing. Photographs show various dies and molds, and several graphs illustrate "TTT" curves, effects of tempering time on hardness and tempering temperature on Rockwell C hardness. (The Uddeholm Co. of America)

For free copy circle No. 1 on postcard p. 141

Presses

With capacities ranging from 50 tons through 75, 100, 125, 150, 200, 250 and 300 tons, a series of presses are illustrated and described in a 16-page brochure. The presses shown are single action, straight-side crankshaft units, offering quality features normally found only on custom-built presses. The catalog describes many advantages for the presses. (Danly Machine Specialties, Inc.)

For free copy circle No. 2 on postcard p. 141

Lift-Truck Attachments

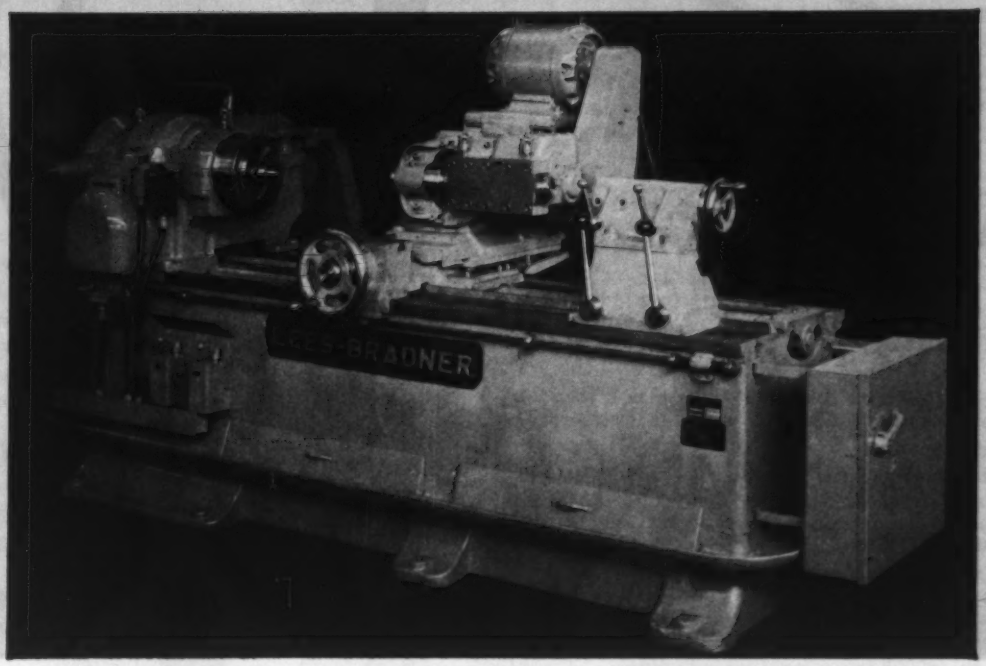
Illustrated throughout with on-the-job photographs, an eight-page brochure shows twenty-four of the newest lift-truck attachments being used in warehouses, manufacturing plants, yards and shipping and receiving docks. It also shows mechanical and hydraulic lift-truck attachments designed for mounting on the carriage and for mounting on the forks. The text includes a brief description of attachment, prices and how-to-use data. (Little Giant Products, Inc.)

For free copy circle No. 3 on postcard p. 141

This WORM...

will turn better...thanks to...

THE LEES-BRADNER HT



Building precision into other machine tools is the unique distinction that can be claimed for The Lees-Bradner Model HT Thread Milling Machine.

The worm illustrated above was produced on this machine by the Cleveland Worm and Gear Co. in one hour 23 minutes at a cutter spindle speed of 61 R. P. M. The pitch diameter of the worm was 3.728″ with an outside diameter of 4.625″.

Many tough thread milling problems like this have been, and are being, solved by this remarkably versatile machine.

Contact us or your local Lees-Bradner representative for complete information on fast, precision threading with the Model HT Universal Thread Milling Machine.

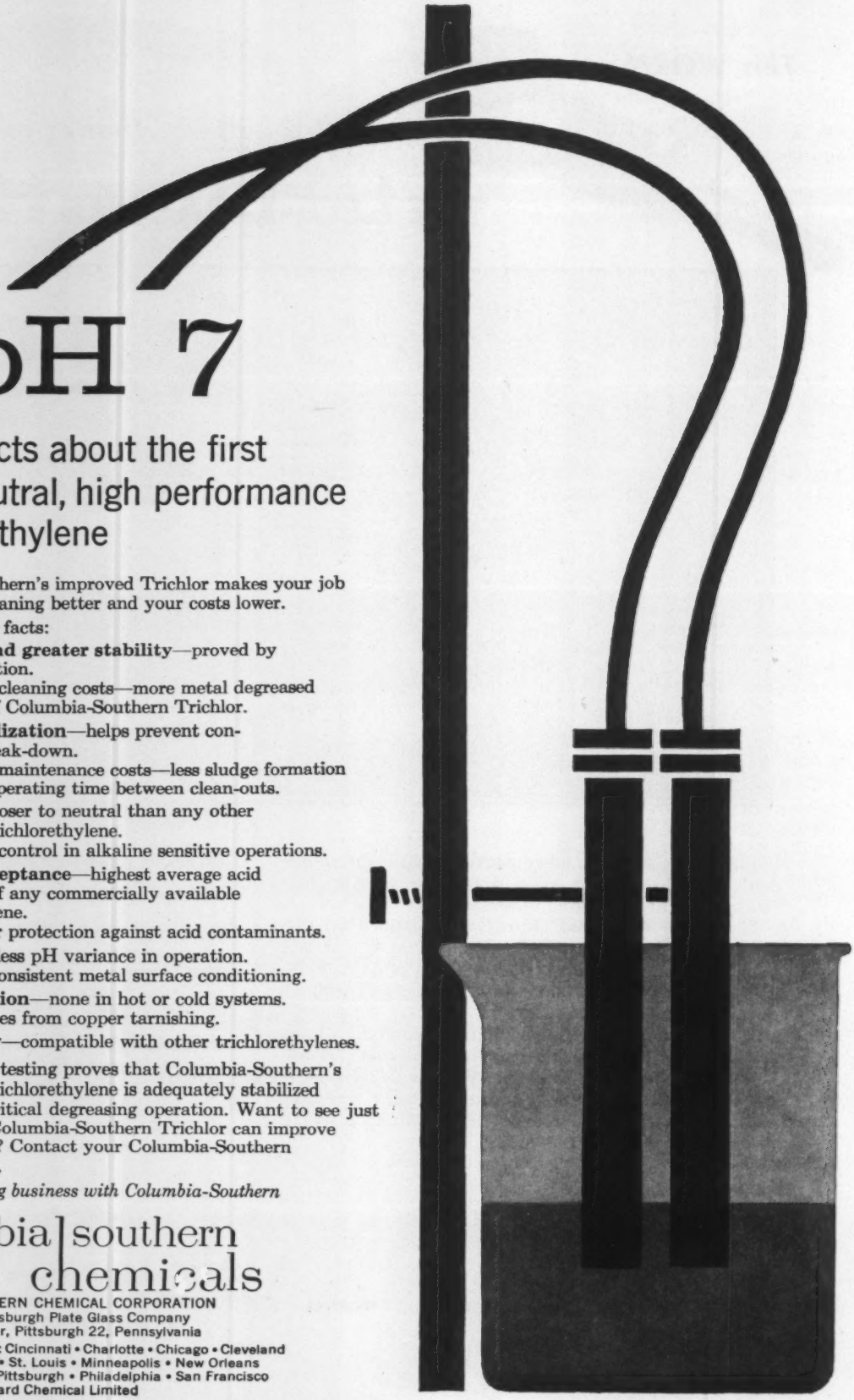
Details on Worm Gear Production

Hob Spindle Speed	61 R. P. M.
Circular Pitch	1.420"
Pitch Diameter	3.728"
Outside Diameter	4.625"
Threading Time	1 hour 23 min.
Material	2315 Steel
Weight of Worm	51.76 lbs.

IMPROVING GEARS... FOR 50 YEARS!

the LEES-BRADNER Company

CLEVELAND 11, OHIO, U.S.A.



pH 7

some facts about the first truly neutral, high performance trichlorethylene

Columbia-Southern's improved Trichlor makes your job easier, your cleaning better and your costs lower.

Here are the facts:

Longer life and greater stability—proved by actual operation.
Result: Lower cleaning costs—more metal degreased per pound of Columbia-Southern Trichlor.

Rugged stabilization—helps prevent contaminant break-down.
Result: Lower maintenance costs—less sludge formation and longer operating time between clean-outs.

Alkalinity—closer to neutral than any other degreasing trichlorethylene.
Result: Better control in alkaline sensitive operations.

High acid acceptance—highest average acid acceptance of any commercially available trichlorethylene.
Result: Greater protection against acid contaminants.

pH Control—less pH variance in operation.
Result: More consistent metal surface conditioning.

Copper corrosion—none in hot or cold systems.
Result: No losses from copper tarnishing.

Compatibility—compatible with other trichlorethylenes.

Extensive field testing proves that Columbia-Southern's truly neutral trichlorethylene is adequately stabilized for the most critical degreasing operation. Want to see just how this new Columbia-Southern Trichlor can improve your operation? Contact your Columbia-Southern Representative.

You'll like doing business with Columbia-Southern

columbia | southern chemicals

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
A Subsidiary of Pittsburgh Plate Glass Company
One Gateway Center, Pittsburgh 22, Pennsylvania

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland
Boston • New York • St. Louis • Minneapolis • New Orleans
Dallas • Houston • Pittsburgh • Philadelphia • San Francisco
IN CANADA: Standard Chemical Limited

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Refractory Clay

Relating a technique for processing refractory clay, a four-page brochure tells the story by use of four-color photographs and minutely detailed captions. The brochure also fully describes the geological history of the development of the Ione clay deposits. The new process eliminates the impurities found in natural refractory clays. (Gladding, McBean & Co.)

For free copy circle No. 21 on postcard

Heavy Tungsten Alloys

Heavy tungsten alloys, with densities of 17 to 18.5 g/cc, are presented in a new 8-page bulletin. Properties, applications, fabrication methods, and available sizes and shapes of three grades are given. The manufacturer's engineering service and facilities are also offered in applying the materials. (Kennametal Inc.)

For free copy circle No. 22 on postcard

Multipoint Recorder

A four-page specification describes a multipoint recorder. The instrument permits changing from 2 to 24 points within seconds. Range and actuation changes are also quick, easy operations. Kits are available for each point, range, or actuation change. (Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 23 on postcard

Milling Equipment

A six-page bulletin tells all about equipment for milling, drilling, slotting, boring, shaping, grinding, and related machining operations on small, medium or large work. The bulletin includes design features, specifications, accessories and sample application possibilities. (The Dumore Co.)

For free copy circle No. 24 on postcard

Solder-Joint Valves

Illustrating each type of valve with a cutaway picture, a four-page folder lists in detail the size and dimensions of gate, globe, and check solder-joint valves. The cutaway picture shows the flow path of fluids through the valve body. A special feature of the circular is the inclusion of an illustrated set of instructions on how to make a good solder joint. (Walworth Co.)

For free copy circle No. 25 on postcard

Die-Cast Card

A useful die-cast, zinc-alloy decimal-equivalent card has numerals on the chart, in raised yellow letters against a black background. This allows for quick, easy reading and range from 1/64 to 1 in. The 3⅜- x 1⅞-in. black and yellow card weighs 6½ oz. Engineers, machinists, draftsmen, students and others will find the card a useful carry-around or on-the-desk reference tool. (The Newton-New Haven Co.)

For free copy circle No. 26 on postcard

Chromatography

Subjects of a set of illustrated four-page brochures are high-speed process chromatograph, and the use of chromatography for closed-loop process control. Diagrams, photos, and detailed specifications are included. (Consolidated Electrodynamics Corp.)

For free copy circle No. 27 on postcard

Atmosphere Analyzer

Describing a furnace atmosphere analyzer, a short brochure also gives operation and installation information for the instrument. The process gas chromatography instrument, for furnace and controlled atmosphere applications, affords completely automatic analysis of selected components in furnace atmospheres, flue gases and controlled atmospheres. The instrument automatically performs a four-com-

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **6/16/60**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

If you want more details on products advertised in this issue fill in below:

Page ..... Product .....

Page ..... Product .....

Page ..... Product .....

INVALID WITHOUT COMPANY NAME—PLEASE TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

.....

City ..... Zone .... State .....

FIRST CLASS
PERMIT No. 36
NEW YORK, N. Y.

BUSINESS REPLY MAIL
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77, Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY MAIL
No postage necessary if mailed in the United States

FIRST CLASS
PERMIT No. 36
NEW YORK, N. Y.

POSTAGE WILL BE PAID BY

THE IRON AGE

Post Office Box 77, Village Station

NEW YORK 14, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **6/16/60**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

If you want more details on products advertised in this issue fill in below:

Page .....Product .....

Page .....Product .....

Page .....Product .....

INVALID WITHOUT COMPANY NAME—PLEASE TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

.....

City ..... Zone .... State .....

FREE LITERATURE

ponent analytical cycle every ten minutes. The brochure lists specifications and sensitivity limits of the new unit. (Perkin-Elmer Corp.)

For free copy circle No. 28 on postcard

Screws and Bolts

Dimensional data, photographs, and drawings in a brochure deal with hex and hex screws, carriage bolts, and lag screws. Over 5500 different fastener types and sizes—including socket-screw products, cap and set screws, dowel and taper pins, bolts, and nuts—are offered to industry through the manufacturer's nation-wide network of industrial distributors. (Standard Screw Co.)

For free copy circle No. 29 on postcard

Tooling Plastics

Ten applications enabling savings of up to 60 pct are outlined in a new three-color, eight-page brochure. Blow core boxes, loose pieces, spotting slugs, match plates, core sticks, cope and drag patterns, fillet pastes and pattern coating resins are but a few of the applications described in the brochure. Fulfilling large cost savings over previously used metals and woods, many patterns can be fabricated at a fraction of previous costs. (Furane Plastics Inc.)

For free copy circle No. 30 on postcard

Metal Products

Facilities for producing products in magnesium, aluminum and other metals are described in a brochure. (The Dow Metal Products Co.)

For free copy circle No. 31 on postcard

Heavy-Duty Coils

Containing 44-pages, a two-color bulletin illustrates and describes a line of heavy-duty coils for steam, steam distribution and hot water. Following a general description of the heavy-duty coils, specific features are highlighted in the bulletin. Materials and construction details are thoroughly discussed. Layout drawings are included, accompanied by tabulated data on dimensions and weights for various types of coils. Coil selection is discussed. Rating curves and related tabular data for an extremely wide range of coil selection are also included in the bulletin. (American Standard Industrial Div.)

For free copy circle No. 32 on postcard

Stepping Motor

A compact stepping motor and indexing device is described in a four page brochure. The brochure is completely illustrated and gives information on this product's exceptionally high reliability and high-torque-to-size ratio. Included are descriptions of uni-directional and bi-directional models, with and without detent. Also given is a complete torque chart, a description of the internal mechanism, and environmental specifications. (Ledex, Inc.)

For free copy circle No. 33 on postcard

Self-Aligning Bearing

A four-page bulletin describes and gives technical information on a patented bearing. The bearing's two-piece outer ring is self-retained around the ball. The bearing is designed for operations which are critical because of high or low temperature, corrosion, or heavy loads. (Smith Bearing Div., Accurate Bushing Co.)

For free copy circle No. 34 on postcard

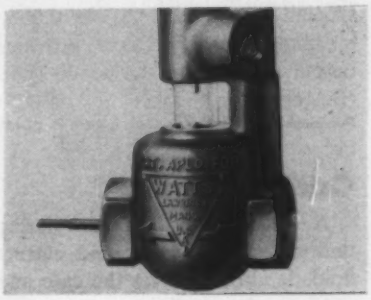
Contact Reactors

Solids-contact reactors, for water clarifying and softening, are presented in a 20-page bulletin. The publication has many photographs and drawings illustrating various types of reactors and their basic design considerations. Explained in the bulletin is the principle of radial horizontal, rather than upflow, as an aid to complete settling of fine precipitates and clarifying. The bulletin also contains information on chemical feeds and auxiliary equipment; and lists many applications for solids-contact reactors. (Cochrane Corp.)

For free copy circle No. 35 on postcard

New Materials and Components

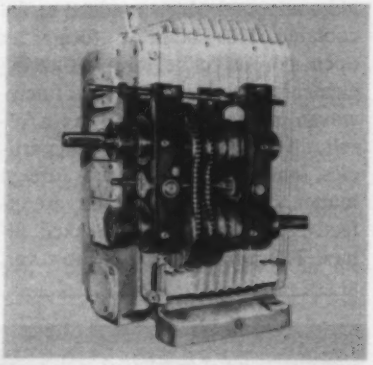
Injection Oiler Lubricates Air Cylinders



Designed specifically for use with low-volume, short-stroke air cylinders, an injection oiler provides proper lubrication. Installed in the pressure line between control valve and cylinder, the oiler delivers a controlled amount of oil direct to the cylinder. The oil travels through a capillary tube within the cylinder air supply line. Oil is supplied to the injection oiler from a standard lubricator placed ahead of the control valve, or from a small oil reservoir under pressure. The injection oiler also comes in kit form with necessary fittings and tubing. (Watts Regulator Co.)

For more data circle No. 40 on postcard, p. 141

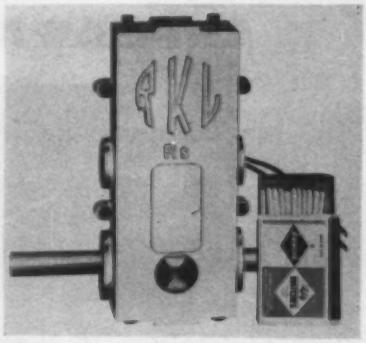
Variable-Speed Drives Feature Compactness



Designed to meet capacities up to 50 hp and ratios up to 5.5:1, constant - horsepower variable - speed drives give precise speed control. They meet infinite speed-varying requirements, and offer positive power transmission through their entire speed range. The drives consist of twin strands of unique single roll chain operating between a pair of facing wheels having a floating center disk. The effective diameters of the wheel faces are altered during operation, changing the ratio and the output shaft speed. In this manner they provide stepless adjustment between maximum and minimum settings on such equipment as heavy machine tools, timing, synchronizing, conveying and handling systems. (Link Belt Co.)

For more data circle No. 41 on postcard, p. 141

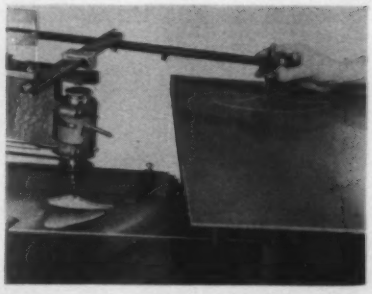
Valve Offers Straight-Through Flow



Solenoid-operated, a pinch-type valve meters, samples, or gives "on-off" control. It can be used in applications involving corrosive fluids, slurries, or dry powder. Capable of producing absolutely gas-tight shut-off under vacuum or pressure conditions, the new valve is made in sizes up to 1 in. The valve consists of a rubber body that is pinched closed by the spring-loaded solenoid mechanism. There are no moving parts in the fluid stream, and no seats, disks, or packing glands to leak. The valve weighs 4½ lb, and measures 2½ x 7¼ x 3¼ in. It operates on standard 110-v, 60-cycle power, but can be supplied in other voltage ratings. The entire valve is encased in a cast aluminum housing. (RKL Controls, Inc.)

For more data circle No. 42 on postcard, p. 141

Machine Makes or Reproduces Parts and Patterns



A pantographic engraving machine does profiling, slotting, milling, and drilling of complicated patterns from a master template. The operator traces the pattern to be reproduced, and the pantograph, at the same time, cuts the material to be worked. Also, the machine makes small parts without layout, where no pattern exists. Working from the original part to be duplicated, the machine reverses its procedure; makes a pattern from the part, then goes back to standard operation to make more parts from the new pattern. (New Hermes Engraving Machine Corp.)

For more data circle No. 43 on postcard, p. 141

DESIGN DIGEST

Speed Reducer

Offering a broad selection of low output speeds, a worm-geared, motorized speed reducer is powered by specially designed 1/20- or 0.035-hp motors. The reducer provides output speeds from 1.9 to 70 rpm. (Boston Gear Works)

For more data circle No. 44 on postcard, p. 141

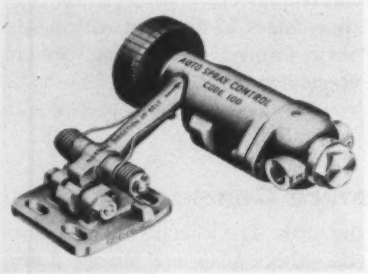
Coolant Filter

A self-flushing, coolant filtering unit saves time, labor and cutting fluid. It also improves the ease and quality of grinding performance. The unit employs a special filtering aid compound which is added to the coolant. This additive forms an open, porous "cake" on the filtering elements, constructed of finely-woven wire-mesh screen. As a result, all sludge, dirt, grit, metal particles, and other suspended foreign matter, down to one micron, are effectively trapped by the caked filters. The purified coolant, however, passes freely through, and is returned to the wheel in a continuous flow for maximum grinding efficiency. (Dundick Tool Works, Inc.)

For more data circle No. 45 on postcard, p. 141

Spray Control

For dust suppression, dampening, and quenching, a spray control incorporates every beneficial feature of which the manufacturer has become aware. Its performance, reliability and serviceability leave very little to be desired. The purpose of this unit is to automatically control supplies of water and fluid sprayed or sprinkled onto transported materials. These materials may be asbestos, coal, coke, granite, gravel, iron and other ores, sand, and stone. Water and liquid wastage is automatically eliminated. The unit is self contained and an outside source of power is not required. (Megator Corp.)



For more data circle No. 46 on postcard, p. 141

Miniaturized Motor

No longer than a cigarette filter, a miniaturized motor allows the direction of rotation to be established by electrical control alone. This 5-oz device was designed for applications where reliability, performance and space are of prime consideration. Currently being used in many applications including the company's own commerical programmers, long-life repeat cycle timers, time delay relays, elapsed time indicators, stop clocks, and other custom designed timers, the motor provides extremely fast starting and stopping. It eliminates prestarting and clutching in many applications. The length of these

EXECUTIVE REPORT #24

APPEARANCES CAN BE DECEIVING

"Low-Price" Abrasives Can Be An Expensive Bargain

Measure the bars. The top one appears smaller, but it's not. Measure your present abrasive cost, and compare it with the proven low cost of Wheelabrator Steel Shot.

Don't be deceived by a low initial price. It's abrasive performance that gives true blasting economy . . . the lower abrasive consumption, faster cleaning, and lower maintenance enjoyed by users of Wheelabrator Steel Shot. Try it, and take a true measure of blast cleaning economy.

SEE THE PROOF IN YOUR OWN PLANT

Your Wheelabrator abrasive engineer will demonstrate the superior performance of Wheelabrator Steel Shot in your own plant. For data to help you control all your blast cleaning costs, write for Bulletin 905-D. Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ont.

WHEELABRATOR
STEEL ABRASIVES

motors is only ⅞ in. The unit's rotor speed is 300 rpm with output speeds of 300 rpm to 1/6 revolution per hour. Direction of rotation is optional and established solely by electrical control. (A. W. Haydon Co.)

For more data circle No. 47 on postcard, p. 141

Machine Mount

Highly efficient, a machine mount uses specially-processed, high-density fiber glass. The mount isolates vibration and eliminates the need to lag down machinery. Guaranteed

not to creep, this new machine mount permits mobile rather than permanently installed production machinery. The mounts are used where built-in level control is not required. It comes in three standard sizes to handle load ranges to 8000 lb per mount. (Consolidated Kinetics Corp.)

For more data circle No. 48 on postcard, p. 141

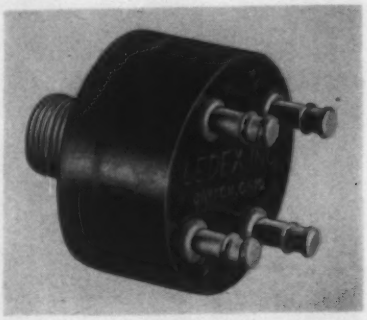
Drills

Capable of drilling hardened steels 51 Rc and harder, a drill anneals the material at the drill-point area as heavy pressure is applied. The drill generates intense heat from the pressure exerted—removing a softened chip. The drills are not recommended for use on materials that are naturally hard and cannot be annealed. With a minimum of 0.004-in. stock to be removed, the drills will operate like a reamer on hardened steel. Size range is from ⅛-¾ in. A set includes sizes 3/16 through ½ in. by sixteenths. (The DoAll Co.)

For more data circle No. 49 on postcard, p. 141

Rectifier

Providing a light, compact, shock-resistant power supply, a silicon bridge rectifier is a 9/16 x 1-1/16 in. diam unit. Molded in epoxy resin, it withstands extreme environments. It has a high surge current rating of 35 amp, a recurrent peak rating of 5 amp, and a peak inverse



voltage of 200. Operating temperature range is —65° to +120°C. (Ledex Inc.)

For more data circle No. 50 on postcard, p. 141

Gage Plate

Circular-type gage plates eliminate much of the bulk of the styles in general use. They are supplied with from one to six holes. A six-hole plate is only 11½ in. in diam. These new gage plates can take the place of the old-style plates in the

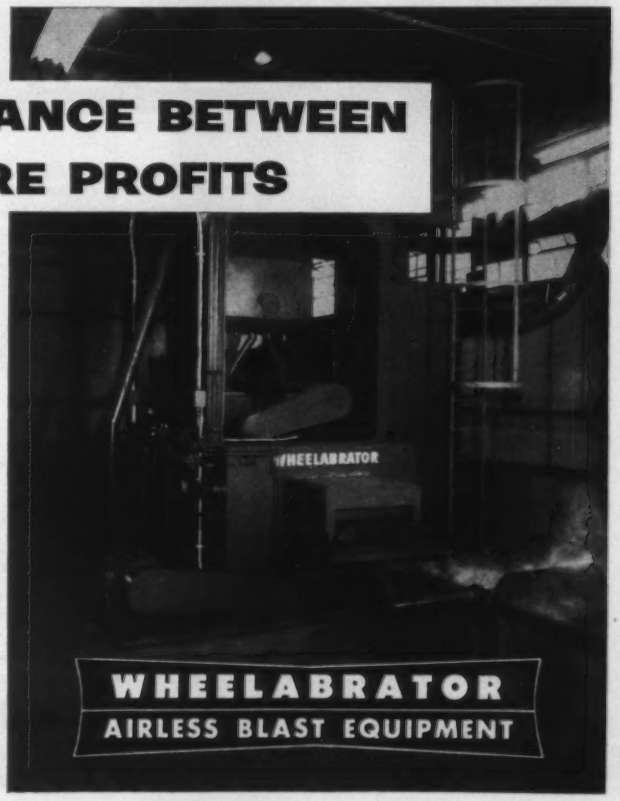
EXECUTIVE REPORT #25

THE SHORTEST DISTANCE BETWEEN STEEL ROD AND WIRE PROFITS

Wheelabrator® Straight-Line Cleaning, Patenting, Coating

At Leschen Wire Rope Division of H. K. Porter Co., Inc., 12 strands of hot-rolled rod go simultaneously through patenting, cleaning and coating in one continuous operation. Wheelabrator mechanical blast descaling is the essential step that makes this efficient processing possible. The blast descaling process eliminates the problems associated with acid pickling, and makes additional savings in time and labor costs.

This efficient production line operates continuously for 24 hours a day, 5 days a week without down time. Investigate the benefits you can realize with this new process for cleaning any type of ferrous or non-ferrous hot rolled rod and bar stock for cold drawn products. Write to Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.



Put 20 tons where you want it

Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

no matter what the two metals are . . .
now you can **SOLDER** them

PROBLEM:
Joining copper pipes in extremely hard water area. Lead solders made porous joints. Heat required for high temperature solders burned copper pipes.

SOLUTION:
All-State's #430, a silver-bearing solder which flows at 430F, made perfect, permanent joints, solved the problem.

ALL-STATE has a solder for joining any commercial metal or alloy to any other . . . in one or more temperature ranges. For typical examples, see tables below:

400°F-500°F							700°F-800°F					
Al.	Copper	Brass	Steel	S.S.	Nickel		Al.	Copper	Brass	Steel	S.S.	Nickel
37	107	107	107	107	107	Aluminum	56	105	105	105	105	105
107	430	430	430	430	430	Copper	105	105	105	105	105	105
107	430	430	430	430	430	Brass	105	105	105	105	105	105
107	430	430	430	430	430	Steel	105	105	105	105	105	105
107	430	430	430	430	430	Stain. Steel	105	105	105	105	105	105
107	430	430	430	430	430	Nickel	105	105	105	105	105	105

Reference numbers above indicate All-State solder to be used for joining metals.

A set of four complete tables, covering temperature ranges from 400F to 800F, is yours for the asking. Send for free Instruction Manual, too.

Distributor-Stocked, convenient to buy. Economical to use.
ALL-STATE WELDING ALLOYS CO., INC., White Plains, N. Y.
Call WHite Plains 8-4646 or write for nearest distributor

company's tool control systems. Or, they can be used for presetting tools where the operations are not extensive enough to warrant the use of tool control boards. The gages furnished with these plates have hardened interchangeable heads which contribute to reduced tooling costs. They are made in bar height, chamfer, flush - pin, and flush - pin with indicator. The latter can have an indicator range from 0.055 to 1.000 in. Gages provide for a presetting range of from 3 to 21 in. (Seibert & Sons, Inc.)

For more data circle No. 51 on postcard, p. 141

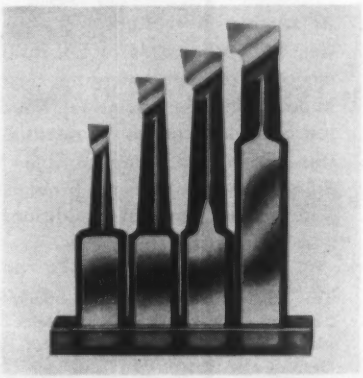
Control Panel

Steel-mill control panels require as much as 35 pct less floor space. Isolated power wiring, easier installation, and dead-front construction are other benefits of the redesigned line. To the steel industry, these improvements will mean lower installation costs, greater utilization of mill space, added safety to personnel, and easier maintenance. Control adjustments are easier to make on the redesigned panels. Vernier adjustments are located next to their related meters. All control relays and regulating circuits are adjusted from the front of the panel. (General Electric Co.)

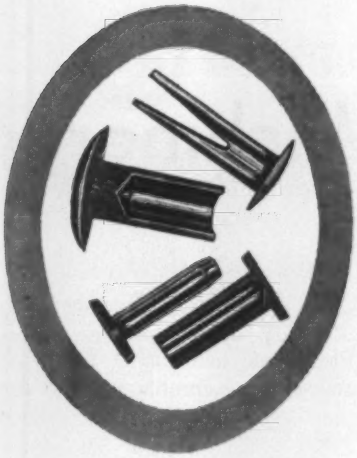
For more data circle No. 52 on postcard, p. 141

Boring Tools

Solid head, high-speed and carbide-tipped boring tools feature ex-

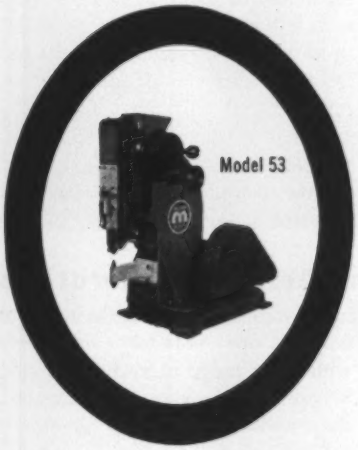


clusive round shanks; with ground parallel flats for solid three-point



COST-CUTTING PRODUCTION TEAM!

. . . the two-way answer to assembly problems!



Here's a combination that cuts production costs and gets rid of assembly problems in a hurry—Milford Tubular Rivets made to high quality standards to assure a better finished product for you . . . Milford automatic rivet-setting machines that can be quickly adapted to your particular fastening needs. Write for more information on how you can put this team to work.

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.

clamping. Designed to be used in engine lathes, turret lathes, jig borers, automatics, boring heads and boring machines, these versatile tools contribute to increased accuracy and higher production. Resharpening the tools is easily accomplished without special holding fixtures. The tools come in any of five shank sizes ranging from ⅜-1 in. in carbide or high-speed steel. (Lido Mfg Co.)

For more data circle No. 53 on postcard, p. 141

Diamond Mandrel

Precision grinding of small diameter holes, in all types of material, can be done rapidly with a new diamond mandrel. The shanks are hardened and ground to a very close limit. Diamonds are mounted under controlled atmospheric conditions by a patented new electronic method. Holes as small as 0.022 in. can be successfully ground accurately and rapidly. In addition to their wide usage on jig grinding equipment, they are used for precision internal grinding. The mandrels are ideal for carbide drawing and header dies. The tools are available in a complete range of sizes from 0.018- to ¾-in. diam. (Precision Diamond Tool Co.)

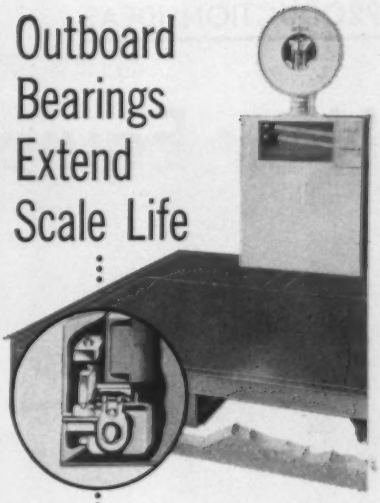
For more data circle No. 54 on postcard, p. 141

Compact Compressor

Designed to simplify installation problems, a line of preassembled, two-stage compressors features an overhead intercooler for greater compactness. The unit can operate in the field either on the floor or mezzanine. All that's needed for installation is the addition of a motor, air and water piping. The compressors cover capacities from 279-3300 cfm and discharge pressures to 125 psi. Direct connection can be made to electric motors, gas motors, or gear turbine drive. Intake and discharge openings are located in a horizontal plane, on opposite sides of the cylinder, to avoid reversal of air flow. (Fuller Co.)

For more data circle No. 55 on postcard, p. 141

Outboard Bearings Extend Scale Life

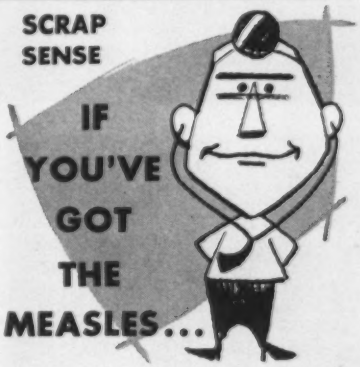


Only DETECTO gives you OUTBOARD BEARINGS!

Write for information on full line of industrial weighing equipment from 1/100 oz. to 100 ton:

Detecto Scales, Inc. Dept. W-2
540 Park Ave., Brooklyn 5, N. Y.

SCRAP SENSE



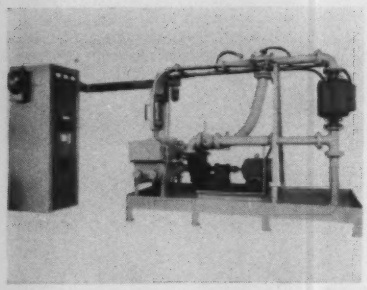
you call in a doctor. If you've got FERROUS SCRAP . . . you call in Clymer Associates. For the sole purpose of this organization is to show companies how to get top dollars from ferrous scrap through proper segregation and classification. After making a survey of your plant and its operations, we will make specific recommendations relating to every aspect of the problem . . . handling, processing, and selling. Today, every efficiency counts. Today . . . call in Clymer.

FIRST IN FERROUS SCRAP CONSULTING

CLYMER ASSOCIATES, INC.

DEPT. 1B, COLONIAL TRUST BLDG., READING, PA.

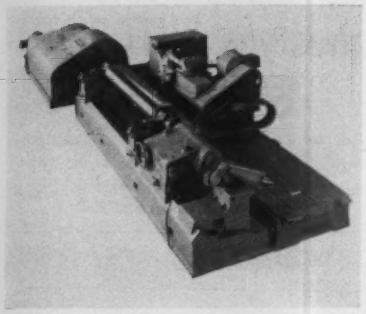
New Equipment and Machinery



System Simulates Tin Line Plating Operation

Simulating the tin line plating operation on a controlled, sample basis, a unit checks samples of metal for brilliance of tin coating. A 6½- x 13¼-in. sample can be plated, reflowed, and tested. It can also be used for fabricating a container for further experimentation. The unit consists of an electrolytic circulating cell, a plating compartment and necessary dc power for plating. Electrolytic temperature regulation and velocity control is provided. The unit also includes a conduction reflow system, and a brilliance comparator. (Designers for Industry, Inc.)

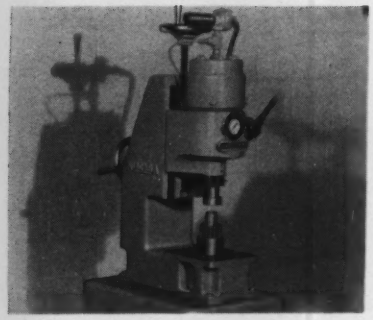
For more data circle No. 56 on postcard, p. 141



Roll Grinder Has Precision Wheel Control

For grinding steel mill rolls up to 20 ft in length, a 60-in. diam capacity roll grinder features an advanced design wheel-feed system. This system provides precise control. The wheelhead tilts into the work in the same manner that crowning of the roll is accomplished. Positive infeed and withdrawal of the grinding wheel can be accomplished to extreme accuracies. For manual control, the handwheel for infeed is graduated to 0.0001 in. It provides a control stop allowing the operator to withdraw the wheel any desired amount. For motorized control, rapid infeed is accomplished by push-button control at 28 ipm. (Farrel-Birmingham Co., Inc.)

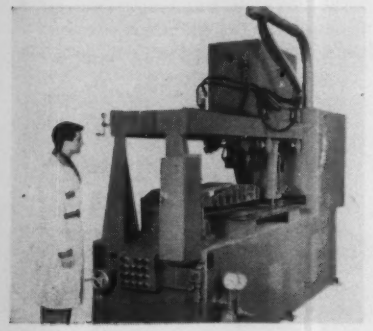
For more data circle No. 57 on postcard, p. 141



Air Press Capable of Many Assembly Operations

Offering a wide selection for punching, swaging, staking, upsetting, and imprinting operations, a line of air presses also seats and removes close-tolerance bearings and bushings. The line of single-acting presses features four sizes ranging from ½- to 2-ton capacities at 85 psi. The press line includes a choice of three air and three electrical control systems. Stroke lengths and shut heights are infinitely adjustable within the range of each press size. Where job requirements demand, the standard, round ram adaptor is quickly replaced with a special adaptor to accommodate a wide assortment of punches and dies. (Niagara Machine and Tool Works)

For more data circle No. 58 on postcard, p. 141



Resistance Seam Welder Joins Strip Coils

Joining strip ends together for continuous processing in tinning, annealing and coil prep lines, a seam welder can speed the welding of thin-gage, overlapped coil ends. As well as a built-in strip shear and automatic weld wheel conditioners, two punches pierce the strip during clamping in order to identify the weld during later operations. When the first strip is clamped, a gage automatically determines its deviation from normal centerline position; it locates a back stop for positioning the rear edge of second strip for exact edge alignment. All operator controls are located at the front of the welder. (Taylor - Winfield Corp.)

For more data circle No. 59 on postcard, p. 141

VULCANITE CENTERLESS WORK AND REGULATING WHEELS

PRECISION MATES!

Centerless grinding is the highest in the art of metal finishing. Unless the work wheel and the regulating wheel have been made for each other, a *needless* handicap occurs. U.S. Rubber centerless wheels are precision-mated. The production of perfect mates for centerless grinding is a U.S. Rubber specialty.

"U.S." Vulcanite was the first rubber-bonded wheel made for industrial America. 100 years of production and research back up our present *precision mates*. The hundreds of plants that use "U.S." Vulcanite *precision-mated* wheels prove the point that to do otherwise imposes a needless handicap.

The "U.S." Grinding Wheel sales engineer will save dollars for you in your grinding operations. We will welcome a call from you at U.S. Rubber, Grinding Wheel Dept., 10 Eagle Street, Providence, R. I., or the address below.

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

NEW EQUIPMENT

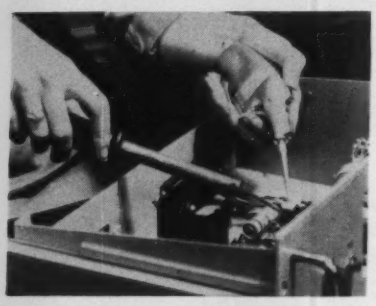
Impregnator

Fully automated, an impregnation unit processes unmachined aluminum die castings. By a unique arrangement of component parts, the 12-ft long, 10-ft wide and 7-ft high impregnation unit combines efficiency and high capacity. The unit has a capacity of 56 cu ft of castings per hour. All working valves are solenoid activated and are operated by air cylinders for completely automatic operation. Timing cycles can be varied at will to obtain the optimum impregnating results. (Imprex, Inc.)

For more data circle No. 60 on postcard, p. 141

Solder Dispenser

A safe, cost-reducing wire solder dispenser tool offers broad application flexibility to the point of solder. The dispenser, with its push-button feeder, adjusts the right amount of solder for each and every application. A selection of attachments

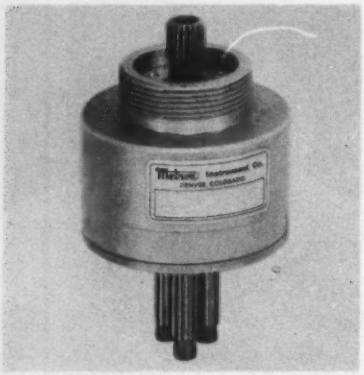


includes straight or curved probes in several lengths for hard-to-get-at areas. The dispenser will feed solder wire from 0.028 to 0.074 in. in diam. (Products for Industry, Div. of Western Lithograph Co.)

For more data circle No. 61 on postcard, p. 141

Multiple Drill Head

Designed for precision production of small parts, a multiple drill head provides speeds high enough for very small drills; on center distances as small as ⅜ in. The drill head features speed ranges of 0-8000 rpm. This speed range makes possible the use of extremely small drills. All spindles are ball-bearing mounted; gears are case-hardened; hole center tolerances are ±0.001 in. Maximum distance between centers is 3 in.; maximum drill size, #20. Case size is 2-, 3-, or 4-in. diam, depending upon



particular requirements of individual user. Each drill head is especially designed and built to user's production requirements. (Metron Instrument Co.)

For more data circle No. 62 on postcard, p. 141

Cleans Castings

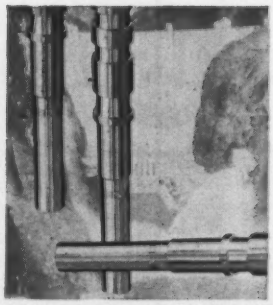
A combination core knock out and blast-cleaning machine is offered as a space and time saver. Essential to the new design is an abrasive separator that removes the sand from the abrasive. The separator is built for the toughest foundry sand loading conditions. It combines the design features necessary for complete purging of sand from an abrasive operating mixture, even when sand loadings approach or equal the weight of the castings being processed. (Wheelabrator Corp.)

For more data circle No. 63 on postcard, p. 141

Machine Tool

For precise machining operations in hard and brittle materials, a compact space-saving machine en-

ables small companies and research and development laboratories to obtain a low-cost ultrasonic machine



HOOVER DAM

call WESTERN UNION operator 25

Your J&L stainless steel distributor can serve you better *because J&L serves him better,* backing him with the full facilities of J&L's Stainless and Strip Division.

Your J&L distributor can reduce your costs by providing a complete range of pre-production services, and doing it economically! He can save you the capital investment required to maintain long term inventories; he can help you eliminate the costs of overhead connected with stocking, accounting, and the inevitable losses incurred through waste and obsolescence due to specification changes.

Technical assistance in solving production problems is also available from your J&L distributor . . . when those problems are connected with an application using stainless steel, J&L's own staff of technical specialists will promptly answer your distributor's call for additional help.

Even when advanced research is required you can call on your J&L distributor in confidence. He will be happy to discuss your problem because he knows he is backed by one of the world's most respected teams of metallurgists—J&L's own staff in laboratories at Detroit and the famous Graham Research Laboratories at Pittsburgh.

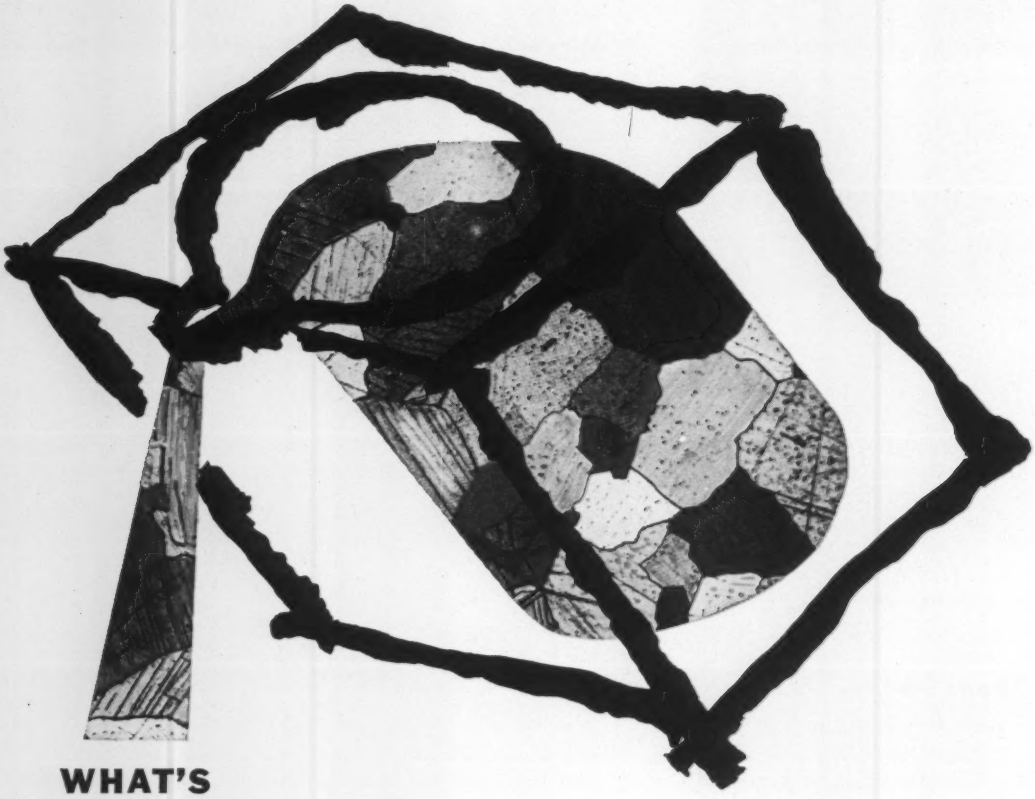
Your J&L distributor is as near as your telephone. Call Western Union Operator 25 for the name of your J&L distributor of Consistent Quality stainless steel.

J&L — a leading producer of stainless steel and precision cold rolled strip steels

J&L STAINLESS

SHEET • STRIP • BAR • WIRE

consistent quality
production
depends on
consistent quality
stainless
steel
Engines of all types move from source to point of use via J&L Consistent Quality stainless steel pump shafts and impellers.
Call Western Union by number—ask for Operator 25
for the nearest source of Consistent Quality J&L Stainless Steel
Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • DETROIT 34



WHAT'S HAPPENED TO INDUCTION MELTING IN THE LAST SEVEN YEARS?

It's a little like the old days all over again! Induction melting passed twenty-five years without change. Then Inductotherm decided to bring induction melting up to date. Since that day, seven years ago, there've been some changes made.

To the basic advantages of induction melting—speed, cleanliness, magnetic stirring—Inductotherm has added easy installation, easy operation, and easy care.

For example, Inducto® initiated power feed through the trunions in their tilting furnaces—thus reducing lead length, cutting power loss, simplifying pit construction. Small furnace design is also ingenious. Even the smallest hand held furnaces have "plug-in" mercury type fittings for fast and effective power disconnect during a pour.

Why do business with Inductotherm?

The biggest innovation in induction melting has been the Inductotherm concept of service. Not just fast repairs and overnight replacement of parts (even M-G sets) . . . but a basic concept of "why we're in business." *Inductotherm is out to fit induction melting to your needs.* We will make every effort to improve our equipment and the induction technique, never asking you to trim your needs to the limitations of our equipment.

If you'd like more information on Inductotherm furnaces, write for Bulletin 70. But, for a taste of Inductotherm service, ask to have an engineer call. Inductotherm Corporation, 412 Illinois Ave., Delanco, New Jersey.

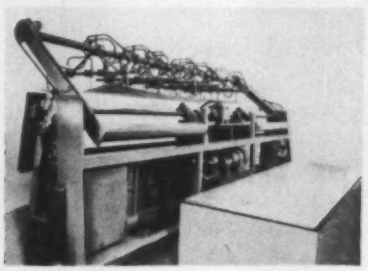
INDUCTOTHERM

tool. It is suitable for low-production requirements, and it has built-in capacity to handle high production as the need arises. For low-production, the transducer and workstation are mounted horizontally. Less than 9 x 36 in. of space is required. The workpiece is fed into the ultrasonic tool oscillating 20,000 times a second under controlled spring tension. Machining tools up to 2 in. in diam can be used. For high-production, the transducer is mounted vertically. A specially-designed adapter, attached to the transducer, transmits the high-frequency vibrations to up to eight individual tools fastened radially to the outer edge. (The Sheffield Corp.)

For more data circle No. 64 on postcard, p. 141

Sheet Feeder

Hydraulically operated, an over-arm feeder feeds sheets from a pile to processing or conveying equipment; or conversely, for piling sheets as they come from production. Sheets may range in size up to 6 ft x 20 ft, and a variety of materials may be handled: plastics, cardboard, metal, and asbestos board. The feeder grasps sheets by means of vacuum cups supported on a carrier which is mounted between two oscillating arms. The feeder handles rectangular or irregularly-shaped sheets, flat or formed sheets, and can pick up or deliver sheets vertically as well as horizontally. It requires floor space only slightly larger than the sheets being handled, has no elevator, stacks sheets in piles 30-in. high, does not mark the



800 to 1 hp favorites for quiet operation, low maintenance and long-life service . . .

From the case of the A. O. Smith Motor Man — a complete stable of integrals that include single-phase models (1-5 hp) or polyphase (1-800 hp). Also a team of fractional-hp motors. All are sure bets to give top performance over the long, long haul.

And there's an A. O. Smith Motor Man near you — champing at the bit to give you 24-hour action on all parts and service orders.

COPYRIGHT 1960, A. O. SMITH CORP.

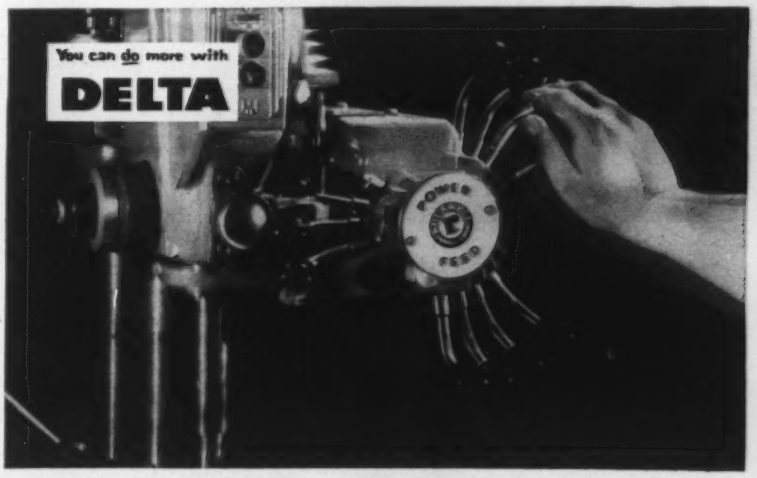
Through research ..a better way

A.O.Smith CORPORATION

ELECTRIC MOTORS

Tipp City, Ohio

A. O. SMITH INTERNATIONAL, S.A.
Milwaukee 1, Wisconsin, U.S.A.



New concept in power feeds

Rockwell announces a new line of Delta 20" Power Feed Drill Presses with a totally different concept: fitting the mechanical control movements of the machine to the natural, easy motion of the operator's hand. This makes possible a simple, low cost method of increasing productivity and improving drilling quality.

Such an advanced development in mechanical power feeds offers advantages *never before available* on a standard drill press—up front control for effortless one hand operation; infinitely adjustable drill point pressure; and a built-in feature for remote control or interlocking with automation devices. Write for free brochure on floor, bench, overhead and multiple-spindle models. Rockwell Manufacturing Company, Delta Power Tool Division, 640F N. Lexington Ave., Pittsburgh 8, Pa.

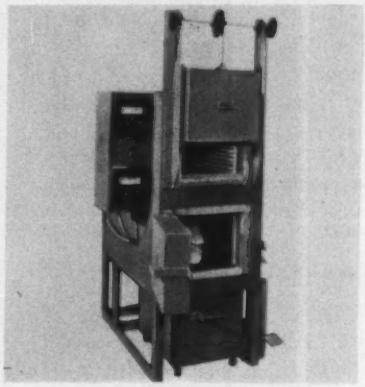
sheets, and is easily serviced since piles are alongside rather than under the machine. (The de Florez Co.)
For more data circle No. 65 on postcard, p. 141

Plating Stop-Off

Leaving no film of any type on metal when stripped away, a crystal-clear coating is suggested for use primarily as a stop-off during electro-plating or painting operations. Since the coating exudes no oil when left standing at room temperature, it is ideal as a semi-permanent coating or a temporary protective coating to protect metals against corrosion. Its base plastic is cellulose acetate butyrate, which is clear in color and extremely resistant to darkening under heat. The formulation melts at 360°F in melting pot, and may be used at 320° to 350°F. The plastic shows no corrosion after the following cycle: 16 hours at 100°F; 100 pct relative humidity; 3 hours at –40°F; 2 hours at 160°F; 3 hours in 5 pct NaCL solution. (Fidelity Chemical Products Corp.)
For more data circle No. 66 on postcard, p. 141

Space-Saver Furnace

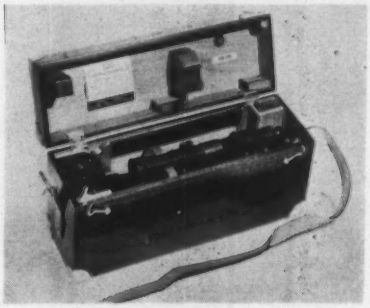
A combination "space-saver" series, and electric heat-treating furnace, is two furnaces in the floor space of one. A complete heat-treating application can be performed with this unit—hardening in the high-temperature furnace; drawing in the low-temperature furnace;



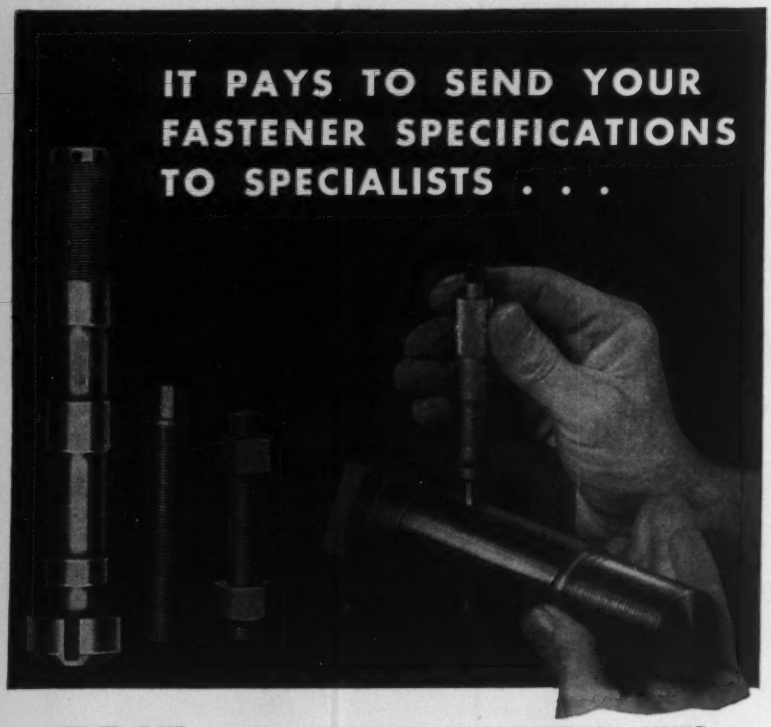
and quenching in the roll-away quench tank. The high-temperature chamber operates to 2300°F. The low-temperature chamber operates to 1250°F. Ten standard sizes are available. All furnaces are complete units — simply connect to power supply. (Lucifer Furnaces, Inc.)
For more data circle No. 67 on postcard, p. 141

Optical Leveling Kit

An optical leveling kit increases the speed and precision of all industrial leveling operations.



Optical leveling offers distinct advantages over conventional leveling techniques. No lines need be stretched; no spirit levels, straight-



ERIE BOLTS • STUDS • CAP SCREWS • NUTS
In Alloys • Stainless • Carbon • Bronze

Your fastener specifications take shape with watchmaker's precision at ERIE. Our craftsmanship is backed by almost a half century of specialized experience. Since 1913, our sole business has been the production of fasteners to customer, government or national standards . . . fasteners to meet extreme temperatures, corrosion, tensiles, fatigue, impact, sheer stresses . . . fasteners for railroads, refineries, diesels, farm and earth moving equipment and other heavy machinery. This wealth of experience will return full value to you when you submit your fastener specifications to us.

A SUBSIDIARY OF RIC REPUBLIC INDUSTRIAL CORPORATION

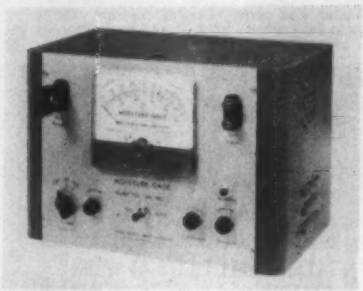
ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives in Principal Cities

edges, surface plates, gages or indicators are required. Optics provide a plane of reference which is absolutely flat and weightless. Readings to 0.001 in. are made easily using the equipment. Uses for the kit include: foundation and bed plate leveling; differential leveling; profiling (the measurement of irregular or curved surfaces), and checking the movement or settling of heavy equipment. (Keuffel & Esser Co.)

For more data circle No. 68 on postcard, p. 141

Moisture Gage

A direct-reading instrument is designed for sand molding, foundry, brewing and chemical industries to gain an accurate, reliable moisture-percentage reading. Battery oper-

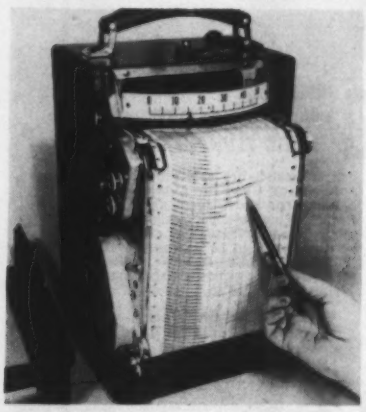


ated, it weighs 8¾ lb. The unit is capable of relating moisture percentages in two ranges. The first is 0-10 pct and the second 0-100 pct. (Henry Francis Parks Laboratory)

For more data circle No. 69 on postcard, p. 141

Recorder Spots Trouble

A graphic recording instrument helps spot hidden trouble in ma-

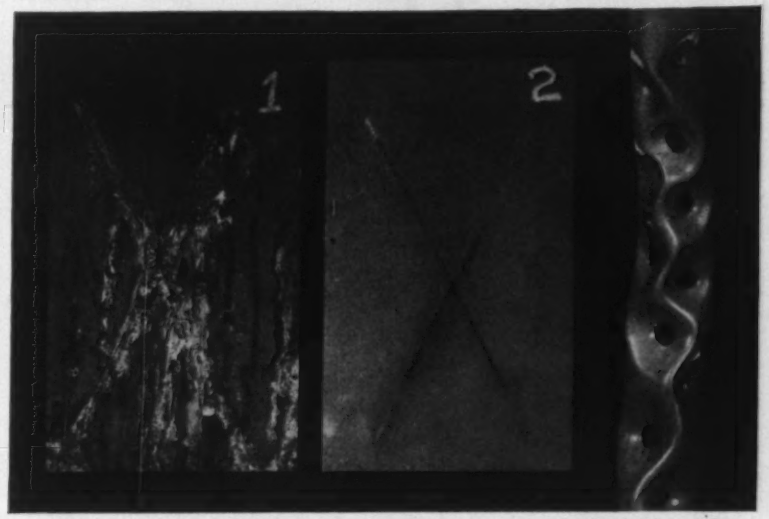


chine operations and processes. It accomplishes this by timing short duration events to millisecond ac-

For economical under-paint protection

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



These two panels were identically painted, scored with an "X", and exposed to salt spray test for 480 hours. The difference: the one on the right was first treated with an Oakite CRYSCOAT iron phosphate conversion coating.

This painted tubing was CrysCoated. Repeated punching did not break paint grip despite severe abuse and deformation.

Oakite CRYSCOAT® iron phosphate coatings cut the cost of corrosion-protection

You get proper protection *plus* economy with CrysCoat iron phosphate coatings.

First of all, they lock paint to steel, giving a superior paint grip under bending stresses. Bend tests show less chipping and flaking of paint. And note how paint held tight even at punched holes in the sample above.

Secondly, they keep corrosion from spreading at every scratch, as the panels above show so graphically.

But most important, they save money. Because CRYSCOAT iron phosphate processes *clean* as they phosphate. Because you need only a three-stage washer. Because *no* acid-proof equipment is required. You save both on equipment and production time. In addition, the smoother iron phosphate coatings soak up less paint than coarser phosphate coatings . . . giving you a sleek finish with one less coat.

It will pay you to *ask Oakite* about phosphating. You'll find the right one for *your* requirements in the complete CrysCoat line which includes both zinc and iron phosphate processes, for spray or tank, for room or elevated temperature operations. Meanwhile, write for Bulletin F-9475. Oakite Products, Inc., 26H Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

over 50 Est. 1909 SCIENCE years' leadership in industrial cleaning

THE
PENNSYLVANIA PLAN:
100% financing
for your
new plant

Complete financing for Lease-Purchase of a new plant is available in labor-surplus areas of Pennsylvania through combined efforts of lending institutions, non-profit community organizations and the Pennsylvania Industrial Development Authority. Interest as low as 2%, with deferred amortization, can be applied on up to one-half of total plant cost.

100% financing is also available in other areas of the State, provided by community organizations, banks, insurance companies and other sources. You select the community you want. You specify plant construction details or choose one of several plant "shells" now being readied for completion.

100% Financing at a Glance . . .
Industrial Plant Construction Costs—

Subscribed by local non-profit community sponsored builder-owner corporations.	*20%*
2nd Mortgage Loan, Pennsylvania Industrial Development Authority.	*30%*
1st Mortgage Loan obtained from banks, insurance companies and similar lending institutions.	*50%*
Total financing, secured through local subscriptions and mortgage loans, without cash investment by the manufacturer.	*100%*

For free copy of "Plant Location Services" pamphlet, or for details on 100% financing, write or call:

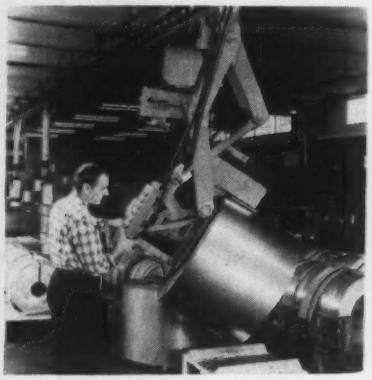
Pennsylvania Department of Commerce
South Office Building
831 State Street, Harrisburg, Pa.
Phone: CEdar 4-2912

curacy, even at slow chart speeds. The recorder monitors automated operations, and provides split-second timing along with "time-of-day" information. This accurate timing aids in detecting equipment malfunction or other difficulties often missed by stop-watch time studies. Standard chart speeds of ¾, 1½, 3, 6 and 12 in. per hour and per minute are provided. The recorder operates on 115 v, 60 cycles. (R. B. Annis Co.)

For more data circle No. 70 on postcard, p. 141

Coil Tilter

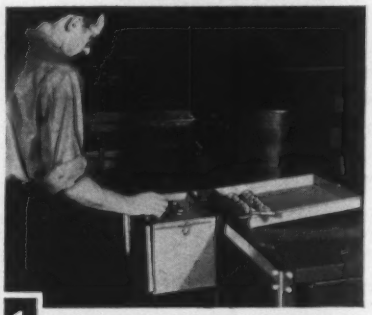
A coil tilter eliminates the use of conventional lifting tongs, floor-mounted tilting devices and "C" hooks for handling coils weighing up to 5000 lbs. in production operations and warehousing. Coil tilters have been designed for loads up to 30,000 pounds. "Up-ending" or "down-ending" of coils results in edge damage with conventional handling units. The coil tilter can pick up a coil, no matter whether it is lying down or standing up. It can change its position and transport it at the same time, and reduce usual



handling time. The coil tilter's stacking ability increases the utility of a stockroom. The unit is powered by two motors—one of which applies an initial grip on the coil, and one which operates the tilting mechanism. Power for these motors is supplied from the crane or hoist by a reel and cable to a plug located on the hook block. Controls may be in the crane cab or in a pendant station with the hoist controls. (American Forge & Mfg. Co.)

For more data circle No. 71 on postcard, p. 141

3 Ways to Increase Production



1 PROVIDE PARTS CLEANING SOLVENT CANS AT THE MACHINE

Keep machinists doing productive work—eliminate unnecessary trips to centrally located parts cleaning station. Machine Bench Can attaches to machine or bench. Depressing fire safe Dasher dips parts; releasing pressure returns parts for draining. 10" x 7" x 8" deep; Capacity 2 gallons.

2 CLEAN SMALL PARTS AT WORK STATION IN AIR OPERATED MACHINES

Clean small machined parts in flammable solvents safely and automatically with Protectoseal Air-Matic Parts Washers. Require no attention from operator during wash cycle. Parts in basket are moved through solution to provide effective cleaning action. Operate on 35 psi. Cap. 6 gal; 30 lb. basket load; 15" x 15" x 25½" deep.

3 APPLY FLAMMABLES WITH AUTO MATIC PLUNGER CANS

Use automatic, fire safe Protectoseal Applicating Cans for assembly or cleaning operations requiring use of flammable solvents. Depressing dasher pumps a measured quantity of solvent into dasher cup to dampen swab, brush, or sponge. Saves time, solvent, reduces toxic or explosive vapor hazard. Made in 7 sizes; capacities to 2 gallons of solution.

Write for Protectoseal Catalog of fire-safe products for handling, dispensing, and use of flammable liquids in production operations.

THE PROTECTOSEAL COMPANY
1926 S. Western Ave. • Chicago 8, Illinois

NEW BOOKS

"Fundamentals of Vacuum Heat Treating," by Ipsen Industries Inc., discusses vacuum pressures and terminology, various pumping systems, gages, valves, and cold traps commonly used with the vacuum furnace. Details include a description of control systems, as well as step sequence operation of the heat-treating cycle. Annealing, hardening, tempering, sintering and brazing under vacuum are also discussed. 50 pp. $2.00 per copy. Ipsen Industries Inc., 715 S. Main St., Rockford, Ill.

"Welding Handbook Section III," by American Welding Society, contains 335 illustrations and 78 tables in its 512 pages. Special welding and metal-joining processes are covered, as well as arc cutting processes. Ultrasonic welding, plastics welding, and welding by cold working are only a few of the developments covered. $9.00 per volume. American Welding Society, 33 West 39th Street, New York 18.

"The Nature of Science," by David Greenwood, is a collection of essays in the general area of logic and mathematics as applied to science. The emphasis is on the linguistic aspects of science and mathematics, written toward those who, though not scientists themselves, are concerned with the application of recent theories of syntax and semantics to the language of modern science. 95 pp. $3.75 per copy. Philosophical Library, Inc., 15 East 40th St., New York 16.

"Evaluation Of Weld-Joint Flaws As Initiating Points Of Brittle Fracture," by R. P. Sopher, A. L. Lowe, Jr., and P. J. Rieppel, is a study of how brittle fractures begin. It shows how flaws of any size or shape, especially cracks or lack of fusion in weld joints, can be considered danger points if the steel is near nil-ductility temperature.

HEAVY DUTY YARD AND FACTORY TRAILERS
INDUSTRIAL CARS AND TURNTABLES
CAPACITIES FROM 2 TO 600 TONS
CUSTOM
46 YEARS OF SERVICE TO HEAVY INDUSTRY
CROSS-BAY® MOTOR-DRIVEN CARS
DESIGNED AND BUILT FOR LASTING SERVICE
For information on trailers . . . . . CATALOG B
and for industrial cars . . . . . CATALOG C
EASTON
EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.
"Cross-Bay", "Custom Built" and "Easton" are registered trade marks of Easton Car & Construction Company

NEW BOOKS

Brittle fractures could be caused only by a combination of predisposing factors. 55 pp. $1.50 per copy. Order PB 161323 from Office of Technical Services, U. S. Department of Commerce, Washington 25.

"Basics of Induction Heating," by C. A. Tudbury, presents the fundamental principles of the induction heating art. Using the pictured text approach, it defines application and equipment needs. The electrical and thermal aspects of induction heating, and the mechanical problems associated with fixturing are thoroughly explained. Two volumes, 140 pp. & 144 pp. $7.80 per set. John F. Rider Publisher, Inc., 116 West 14th Street, New York.

"The Investigation of Radioisotopes for the Inspection of Ship Welds," by Naval Ordnance Laboratory, covers isotopes of thulium 170, cesium 137, cobalt 60, and iridium 192. It explains the best nondestructive, radiographic technique for inspecting ½- to 2-in. steel plate for ship hulls. Design of a portable exposure container is discussed. 61 pp. $1.75 per copy. Order PB 161324 from Office of Technical Services, U. S. Department of Commerce, Washington 25.

"Handbook of Successful Sales Meetings," by W. N. Newman, sets forth tested ideas for any type of sales meeting. Whether it's to launch a new product, announce a change in sales strategy, or pep up the field force, the author anticipates and answers your every question. 208 pp. $6.50 per copy. Prentice Hall Inc., 70 Fifth Ave., New York 11.

"Report on Stress - Corrosion Cracking of Austenitic Chromium-Nickel Stainless Steel," prepared by ASTM, reviews such problems as identification of stress corrosion, susceptible compositions, influence of heat treatment, surface finish, critical environments, corrosion, and preventive measures. 96 pp. $6.00 per copy, ASTM Headquarters, 1916 Race St., Philadelphia 3.

"Coated Abrasives, Modern Tool of Industry," represents the combined knowledge of the nation's major manufacturers of coated abrasives. The book covers the entire field of coated abrasives, and contains over 400 pages and 546 illustrations. $8.50 per copy. Coated Abrasives Manufacturers' Institute, 711 3rd Ave., New York 17.

"Introduction to Solids," by Dr. Leonid V. Azaroff, attempts to make all solids comprehensible by referring them to the one quality they have in common—their crystalline structure. The book explains the properties of solids and interprets them through crystallography. McGraw-Hill Book Co., 330 W. 42nd St., New York 36.

Whatever the load... use

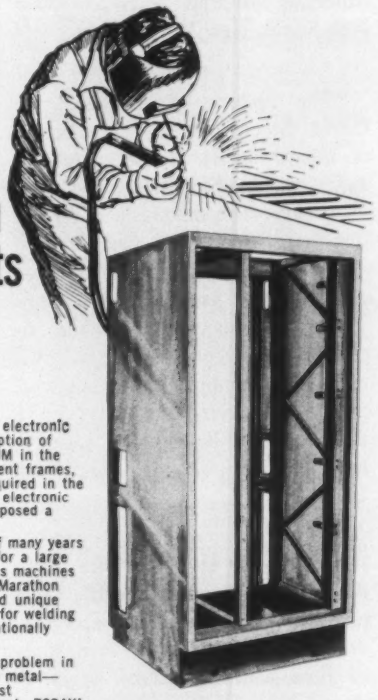
ELECTROLIFT WORM-DRIVE HOISTS

- Simple to operate—one man control, push-button or rope
- Built to last—with minimum maintenance and automatic lubrication
- Safe—alloy steel worm-drive brake holds loads securely
- Compact—no overhung gears... allow close headroom
- Clean and quiet—working parts are fully enclosed

ElectroLift worm-drive hoists give you smooth, fast control over loads of from ¼ to 10 tons. For details on speeds and models, consult your ElectroLift representative, listed in the classified directory.

WORM DRIVE ELECTROLIFT HOISTS

204 Sargeant Avenue Clifton, N. J.



NOW aluminum weldments —in close tolerance components!

Since the early days of electronic computers and the adoption of lighter weight ALUMINUM in the manufacture of component frames, precision tolerances required in the development of modern electronic computer devices have posed a serious problem.

Out of the experience of many years of component building for a large manufacturer of business machines and computer devices, Marathon Industries has developed unique methods and equipment for welding ALUMINUM within exceptionally close tolerances.

If you have a weldment problem in ALUMINUM—or with any metal—write or call your nearest Marathon Industries branch, TODAY!

COMPLETE METAL FABRICATION, ELECTRONIC ASSEMBLY

MI

MARATHON INDUSTRIES, INC.

61 Huntington St., Cortland, N. Y., SKyline 6-2866

Lexington, Ky., Phone 5-0020

OR HOW TO DEGREASE MORE PARTS PER DOLLAR OF CLEANING COST

Every time they needed more vapor-degreasing solvent, the drum was empty, it seemed.

At first it didn't bother them much. Then, suddenly, they realized what was happening to their degreasing costs.

The solvent wasn't lasting as long as it should between bath cleanouts. That's why they had to use so much of it. Worst of all, every time a bath went sour they had to pull the degreaser off the line. That is where the real expense was lurking: in slowed-up production.

PSP TO THE RESCUE They solved the puzzle—with a degreasing solvent that can't wear out prematurely. It has permanent staying power—psp—because it's protected by a stabilizer that doesn't get used up during degreasing.

You stand a good chance of getting lower metal-cleaning cost with this solvent, too. It's called Nialk TRICHLOR. You don't have to add fresh stabilizer to it. Even when you distill the solvent, it remains stable. Even the vapor is stabilized. And you use less solvent, because less goes down the drain in unnecessary cleanouts.

Interested in finding out what you can save with this better trichlorethylene? Your Nialk TRICHLOR distributor can give you swift service on the quantity you need. Call him today.

NEW 36-PAGE BULLETIN explains fully how you get more and better vapor degreasing for the money with Nialk TRICHLOR. Shows basic types of vapor degreasers. Discusses cycles, operating procedures, stabilizers, causes of solvent contamination, solvent recovery, trouble shooting. Ask your distributor for a copy or write us.

Nialk® Trichlor, a product of

HOOKER CHEMICAL CORPORATION

306 Union Street, Niagara Falls, New York

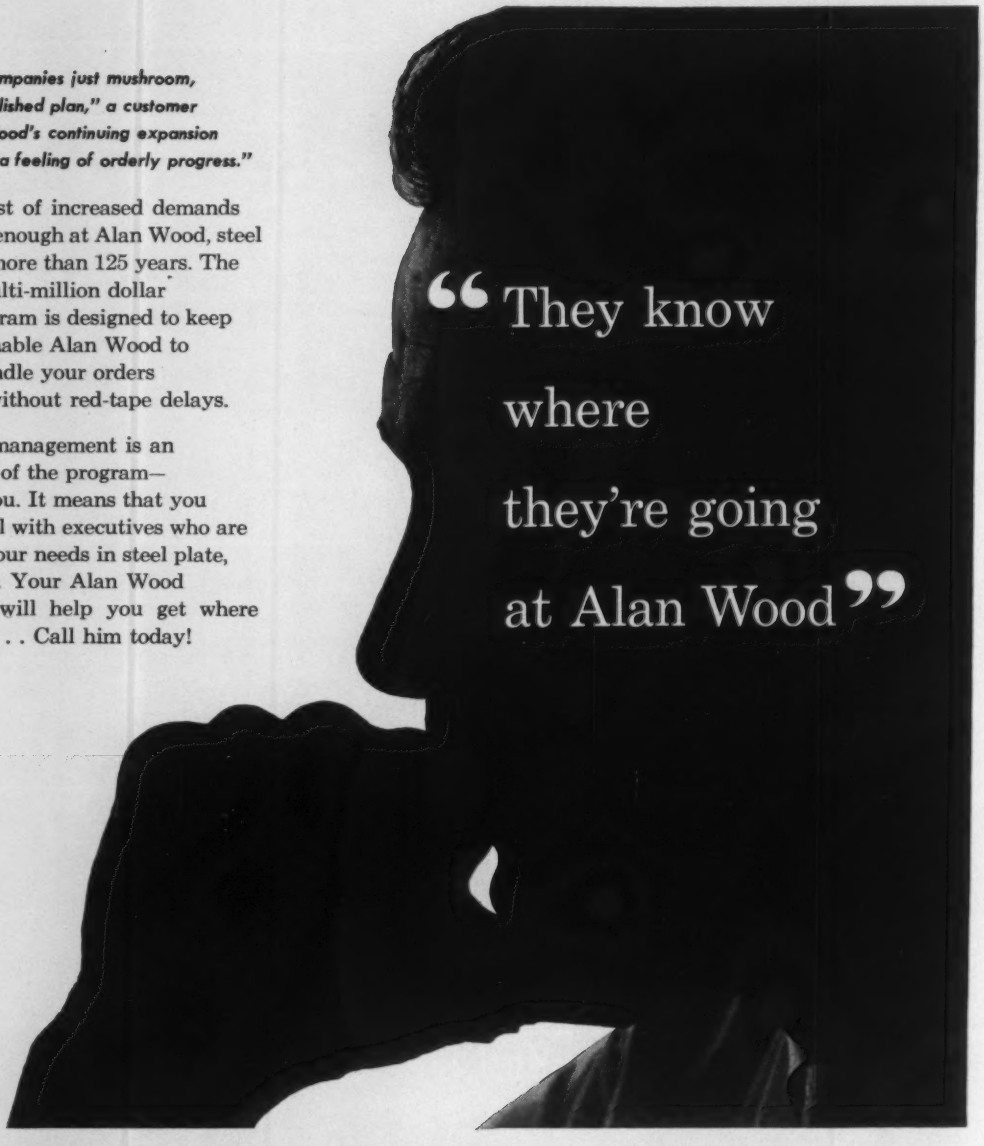
Sales Offices: Buffalo Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS

"A good many companies just mushroom, without any established plan," a customer remarks. "Alan Wood's continuing expansion program gives us a feeling of orderly progress."

Keeping abreast of increased demands for steel is not enough at Alan Wood, steel producers for more than 125 years. The Alan Wood multi-million dollar expansion program is designed to keep *ahead* . . . to enable Alan Wood to continue to handle your orders immediately, without red-tape delays.

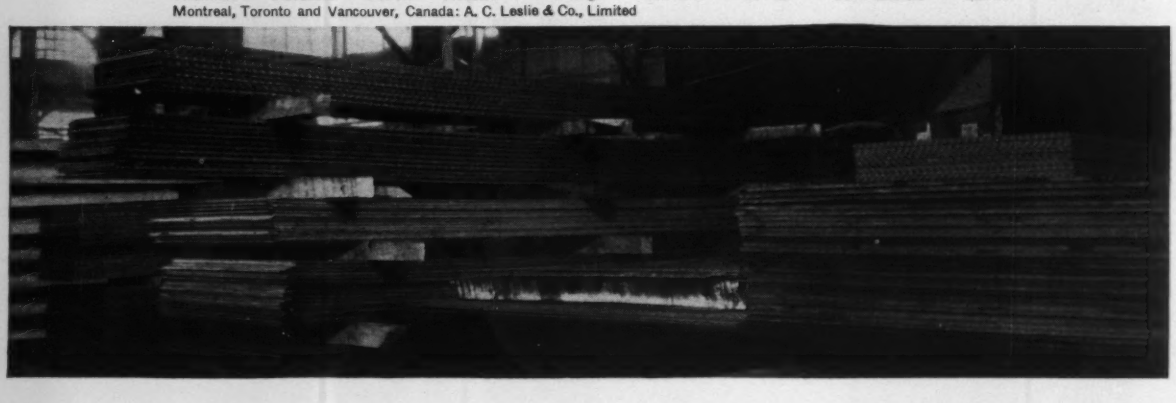
Continuity of management is an important part of the program—important to you. It means that you continue to deal with executives who are familiar with your needs in steel plate, strip and sheet. Your Alan Wood representative will help you get where *you* are going . . . Call him today!



ALAN WOOD STEEL COMPANY

Conshohocken, Pa. • **STEEL PRODUCERS WITH THE CUSTOMER IN MIND**

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Los Angeles • Boston • Atlanta
Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle
Montreal, Toronto and Vancouver, Canada: A. C. Leslie & Co., Limited



The Iron Age Summary

Steel Mills Hope for Fall Upturn

Short term factors show little to cheer the industry. Most hopes are pinned on an expected upturn in late summer or fall.

Continued drop in steelmaking operations is likely, with the low point probably about 50 pct of capacity.

■ Steel operations continue to head down. Production will hit a low point at or near 50 pct of capacity on the holiday-shortened July 4 week.

But even after that, no significant rebounding is expected until late summer or early fall.

Gloomy Outlook—Most of any current optimism is based on autumn hopes and the long-term evaluation. There is nothing in the order picture now to justify hopes of a sharp uptrend in the near future.

July orders are disappointing. A recent flurry of automotive orders has subsided. Flat-rolled products appear to have leveled, but many products have not yet hit bottom.

Positive Thinking—While short-term gloom appears to dominate the market, there are these positive factors in the market outlook.

1. Inventory cutbacks will have to end soon. Even with summer slowdowns taken into consideration, a rate of steel purchasing to meet consumption will show an improvement.

2. Automotive orders for the early rush of 1961 models will come in soon. Some body makers and suppliers have made their first moves, but this has not been general.

3. In spite of some cutbacks, the rate of capital spending for this year is still high. It has not yet been felt in the steel market to the extent anticipated. As a result, some improvement in construction and machinery steel orders should materialize.

4. Can makers have increased their tinplate releases and the mill logjam on tinplate is breaking up. Mills are reducing their own inventories and the production outlook is good.

5. The effects of automotive purchases of foreign steel lasted longer than almost anyone expected. One major automaker, the last to do so, will clear up its foreign steel only this month.

Import Factor—The heavy shipments of foreign steel to automakers are largely responsible for the first quarter bulge in steel imports. Automakers placed heavy orders (which could not be cancelled) when a long shortage was expected. They came in just as the market was weakening, adding to the softness.

Automakers are reported to be planning to start 1961 production on a 20-day inventory of steel. They will accomplish their build-out of 60's very smoothly, with little steel left in stock that is unsuitable for next year's models.

Further easing of the steel market is indicated this week in reduction in net charges for lighter gages of tinplate. The initial move, made by U. S. Steel Corp. reduced thickness and width charges for the lighter gages.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,775	1,756	2,031	2,620
Ingot Index				
(1947-1949=100)	110.5	109.3	126.4	163.1
Operating Rates				
North East Coast	69.0	65.0*	76.0	99.0
Buffalo	58.0	61.0	74.0	96.0
Pittsburgh	60.0	61.0*	72.0	97.0
Youngstown	40.0	39.0	46.0	85.0
Cleveland	69.0	67.0*	75.0	94.0
Detroit	80.0	79.0*	93.0	97.0
Chicago	63.0	64.0	73.0	93.0
Cincinnati	64.0	64.0	82.0	82.0
St. Louis	77.0	77.0*	83.0	91.0
South	67.0	62.0*	72.0	88.0
West	68.0	69.0*	73.0	89.0
U. S. Rate	62.3	61.6	71.3	92.5

*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$31.50	$31.50	$33.17	$38.17
No. 2 bundles	$20.83	$21.17	$23.17	$25.33
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	101.25	101.00	99.50	104.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Buyer's Market Hits Bearings

The softness in the market has developed in the last two months. Shipments top last year, but backlogs are dropping.

Bearings industry turns to research and standardization in look to future.

■ The bearings market has turned into a buyer's market in the last few months.

A spokesman for a bearings maker reports that there is plenty of capacity in the industry. And another company says its distributors now have good stocks of bearings that are standards for its particular types of customers.

Generally buyers can get in immediate delivery of standard items.

Prices Stable—Prices are about the same as they were last year. And they are not likely to change in the next 3 to 6 months at least.

Bearings makers complain that their operating costs are continuing to rise. But they say the competition is keener than ever, and is holding prices down. Most companies insist profit margins are about as slim as they can afford, so they see little chance for prices to drop in the foreseeable future.

The softness in the market has developed in just the last two months. Most bearings makers report good business for the first four months of the year. Then, they say, many customers started getting inventory conscious. A spokesman for one company says he believes buying has been trimmed in anticipation of a drag in customers sales, rather than an actual drop.

Less Backlogs — Shipments still top last year and are continuing to hold up. But backlogs are dropping. Right now they are down to about 8 to 10 weeks. They may fall further. But some bearings companies are looking for some pickup in the fall.

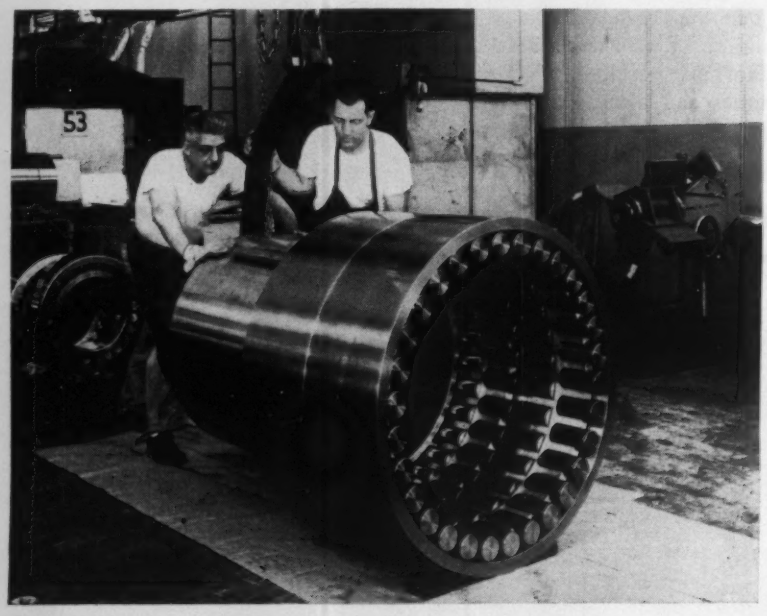
Still Good Year — Despite the soft market now, the industry expects 1960 to be good. Some companies, such as Norma Hoffmann Bearing Corp., Stamford, Conn., expect to top 1959 by as much as 20 pct. Generally, the industry expects to wind up 1960 slightly ahead of 1959.

While the bearing industry is primarily a production rather than a research industry, there is a lot of development work going on.

More Research — Three of the major trends, according to SKF Industries, a major bearings maker in Philadelphia, are: Development of quieter running bearings; lengthening bearing life; and more use of exotic metals to meet the problems of higher temperatures and greater speeds to which bearings are being subjected.

There is also a trend toward more standardization. Bearings makers still have to make thousands of different sizes and shapes. But more and more are trying for interchangeability to widen their scope, and cut costs.

One problem worrying some bearings makers: The trend in military aircraft away from manned airplanes now looks like it may cut sharply into the military replacement market, which has been lucrative for many bearings makers.



GIANT BEARING: Multi-row cylindrical roller bearing is assembled at SKF's main plant, Philadelphia. Used on back-up rolls of four-high rolling mills, bearing weighs 7000 lbs, has 46.5 in. diameter.

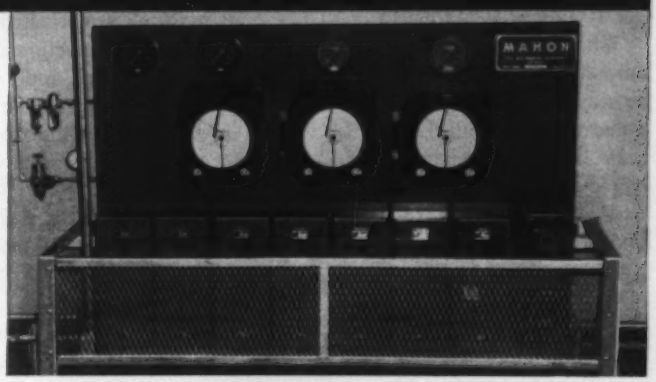
PROCESS EQUIPMENT .... BY MAHON

new plastic-curing oven system for GOODYEAR is double-decked for efficiency

Curing of 75-ft. long, 7-ft. wide sections of a spongy plastic material, with heating and cooling cycles rigidly controlled, is a tough processing problem. Mahon equipment does the job two-at-a-time . . . and also automates the method! This new oven system converted the operation to a smooth, continuous process.

The unusual installation (shown above) is 80-ft. long with double-decked ovens for increased capacity. Specially developed by Mahon and Goodyear engineers, the system features integrated materials handling, precisely controlled heating and rapid cooling. Curing is done at preset temperatures up to 300°F, the ovens holding the plastic sections for about eight hours. At the end of this cycle, the entire system is fast cooled, the work discharged and the ovens brought back up to heat—all automatically.

If you are considering new or improved process equipment call in a Mahon engineer . . . their assistance could prove invaluable.



Special oven control panel, designed by Mahon for the Goodyear Tire and Rubber Co., monitors the entire eight-hour curing cycle for the plastic material.

Write for Descriptive Catalog A-660 on the scope of Mahon Industrial Equipment for metal finishing, cleaning, painting, heating, heat treating, etc. Also in Sweet's Plant Engineering File.

THE R. C. MAHON COMPANY

Detroit 34, Michigan

YOUR BIGGEST VALUE is in MAHON'S planning and engineering EXPERIENCE

MAHON

Manufacturing Plants—Detroit and Los Angeles, Calif. Sales-Engineering Offices in Detroit, New York, Chicago, Los Angeles and San Francisco

Price Situation Called Chaotic

Steel service centers continue to revise item-order quantity charges—mostly downward.

Constant changes make it difficult to keep track of current prices.

■ Warehouse extras came in for another session of shuffling at Jones & Laughlin Steel Corp. Warehouse Div. late last week. About the same time, U. S. Steel Corp. reduced extras on some plated products.

Of 34 possible item-order quantity combinations, J & L reduced prices on 30, raised price 15¢ and 25¢ on the others. The overall result is an average reduction in steel warehouse prices estimated at 35¢ per 100 lb, or $7 a ton.

While the average decline amounts to only 35¢ per 100 lb, cuts as high as $4 occured in small quantities. And at the top of the scale, the new pricing provides a 40¢ discount on orders of 20,000 lb and over with items of 10,000 lb and up.

"Chaotic" Situation — The price changes were first made in Chicago, Louisville, Indianapolis, and Cincinnati. Since then, they've been reflected in price changes in Milwaukee, Minneapolis, St. Louis, Rockford and other points. Other major warehouses are following the J. & L. move.

One warehouseman calls the price situation "chaotic." He says warehouses haven't been able to keep net pricing books current with price changes. In many cases, price changes are verbal. New net price books are expected when the situation firms—but many warehousemen don't believe that will happen until August.

U. S. Steel's changes were at the mill level. The company lowered net charges for lighter gages of tinplate. Thickness and width charges were reduced for hot-dipped, electrolytic tinplate and for black plate. Width charges were revised for holloware enameling.

Range of Changes — Thickness changes affect only tinplate of 70 lb weight or under. New deductions per base box for hot-dipped tinplate are now: 90¢ for 70 lb tinplate, up 5¢; $1.05 for 65 lb tinplate, up 10¢; $1.20 for 60 lb tinplate, up 15¢; and $1.35 for 55 lb and under tinplate, up 20¢.

Comparable changes have been made for electrolytic and others. Increasing the deduction reduces the net price. Prices apply to tinplate made by conventional means.

Allegheny Ludlum Steel Corp. reduced extra charges for consumable electrode vacuum melting of a group of quality-grade tool steels used primarily for aircraft bearings. The reduction brings the price of representative billets of AL's vacuum-melted Teton tool steel in base quantities down 12¢ per lb to $1.02525.

Sheet and Strip—From all indications, July will be a slow month for sheet mills. An **East Coast** mill will take advantage of the slack to close down its cold-rolling line for a week of overhauling. Order book for sheets is smaller but firmer, says a **Pittsburgh** mill, noting that cancellations and deferments have subsided. Orders for sheet for 1961 model cars have been spotty, according to reports from **Detroit.** Mills are watching these orders closely, would like to get an idea of whether automakers expect a strong or weak fourth quarter. At Chicago, automakers have moved some July steel back to August, weakening the month even more.

Plates and Shapes — Bids for Navy ship plate are getting prime attention on the **East Coast.** But aside from military orders, users are either working off stocks or buying production tonnages for fast delivery. The first **Japanese** cargo ship ever to call at **Cleveland** arrived last week. Included in its cargo were 150 tons of steel; at least part of it was wide plate. Chicago continues to report capacity operations for wide-flange structural mills in the district.

Pipe and Tubing—A small improvement in orders for standard pipe is reported by one **Pittsburgh** mill, another sees no change. The situation is the same at **Cleveland** where a mill says it has received a few new orders for standard pipe. In either market, it's only a little better than before. But the prospects remain poor for oil country goods and other pipe, according to reports from pipe producing areas. Although the drilling rate is up slightly, big oil producers are determined to operate with little or no inventory.

Stainless—So far, there has been no sign of an upturn in customer orders. Some improvement is expected when automakers and their suppliers start ordering for new models. As it stands, mills are able to take care of most orders from stock. And they are able to fill the rest in three weeks or less.

PURCHASING AGENT'S CHECKLIST

Tight inventory policies are not cause of drop in output, four executives say. P. 81

New process successfully hot works refractory metals without contamination. P. 88

Ultrasonics provides low-cost cleaning of smudge from descaled steel strip. P. 119

COMPARISON OF PRICES

(Effective June 14, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	June 14 1960	June 7 1960	May 17 1960	June 16 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.60	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Bas price	6.196¢	6.196¢	6.196¢	6.196¢

	June 14 1960	June 7 1960	May 17 1960	June 16 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$31.50	$31.50	$34.50	$42.50
No. 1 steel, Phila. area	33.50	33.50	34.50	37.50
No. 1 steel, Chicago	29.50	29.50	30.50	34.50
No. 1 bundles, Detroit	27.50	27.50	29.50	35.50
Low phos., Youngstown	34.50	34.50	36.50	42.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	50.50	49.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	46.50*	48.50	51.50	58.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$31.50	$31.50	$33.17	$38.17
No. 2 bundles	20.83*	21.17	23.17	25.33
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$33.00	$33.00	$33.00	$31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	101.25	101.00	99.50	104.00
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

Prices At a Glance 161
Comparison of Prices 165
Bars 175
Billets, Blooms and Slabs 173
Boiler Tubes 179
Clad Steel 179
Coke 178
Electrical Sheets 179
Electrodes 179
Electroplating Supplies 179
Fasteners 177
Ferroalloys*
Iron Ore 177
Merchant Wire Products 177
Metal Powders 179
Nonferrous
Mill Products 172
Primary Prices 165-170-172
Remelted Metals 172
Scrap 172
Piling 173
Pig Iron 177
Pipe and Tubing 178
Plates 175
Rails 179
Refractories 179
Service Center Prices 176
Shapes 173
Sheets 174
Spring Steel 179
Stainless 177
Steel Scrap 168
Strip 173
Structurals 173
Tinplate 174
Tool Steel 177
Track Supplies 179
Water Pipe Index 178
Wire 175
Wire Rod 174

* Appears in the June 9 - June 23 issues.

Since 1903

GEO. F. MARCHANT CO.

PUNCHES - DIES
RIVET SETS

Write Dept. B. for Catalog 60

and

New Stock List

1420 South Rockwell Street, Chicago 8, Illinois

Domestic Sales Slow To a Walk

With export the only active market, domestic prices are either just holding on or continuing to drop off.

Cast grades decline as foundries get ready for a slow summer.

■ Domestic sales are slowing down to a walk. Only the export market is providing any life in the market.

Mill purchases of steelmaking grades are few and far between. Usually the tonnages involved are meager. Activity is limited in other grades, too.

Cast Market Off—Cast grades dropped this week in many markets as foundries cut back on scrap buying. Turnings have shown little movement for some time. Stainless grades are weakening, with prices continuing down.

Declines in No. 2 bundles at Chicago dropped The IRON AGE No. 2 Bundles Composite to $20.83. This is approaching the low monthly average of $18.38, set in March, 1954.

Lack of interest in scrap is slowing collections and forcing down dealer buying prices. Railroad offerings are also meeting with limited interest.

Pittsburgh—Trading has come to a standstill. Mills say they are still gaining in supplies of home scrap and customer scrap. Low prices have slowed yard collections. They have also cut the supply of railroad scrap. Prices of No. 1 railroad heavy melting ranged from $33 to $37 at the broker levels. One railroad withdrew a portion of its offering. The total tonnage offered on the market was small.

Chicago — Some steelmaking grades are off $1, primarily on an appraisal basis. Mills are purchasing only in small quantities. Offers to sell have brought little mill reaction. Collections continue to decline. Although some foundries are placing orders, some cast grades slipped off as much as $2 on low volume purchases.

Philadelphia—About 90 pct of orders are for export, according to broker sources. Nine boats, not all full cargoes, are in or expected in during June. These orders are holding up the market and keeping yards fairly well cleaned out. Much export tonnage is now coming in from fringe areas on freight rates. Mills would have trouble buying at present domestic prices, dealers say. Reason: Listed prices are lower than those paid by the dealers for collections.

New York — Export demand, which is described as "fair," is still holding up prices. Other than that, the domestic market shows no change. Stainless grades are still faltering. Both 18-8 prepared solids and 430 prepared solids are off $5 a ton due to an almost complete lack of demand.

Detroit—There is no mill buying. Dealers and brokers expect prices to keep drifting down until mills support the market. Dealer inventories are high, especially on lots of No. 1 bundles.

Cleveland — The market weakened in tone as a small tonnage of industrial bundles and busheling sold in the Valley for $35. However, at Cleveland a foundry offering $36 for 2 ft cut structural found no takers. Local yards generally have little top grade scrap around. Cast grades took a long delayed drop as foundries got ready for a slow summer. Stainless is down $5 in a dull market.

St. Louis—Prices of most railroad, turnings and cast grades sank lower. They were off $1 a ton. However, for the first time in weeks, market demand shows some signs of picking up.

Cincinnati—Dealers are unwilling to sell anything more than small tonnages at present prices. So brokers are filling orders slowly. Any increases in buying would have to carry higher prices.

Birmingham—Prices here are at their lowest since 1954. Steel foundries are buying only small amounts. But openhearth, electric furnace, and cast consumers say they plan little or no new buying.

Buffalo — The market remains soft. Prices are unchanged. There are no new sales. Collections of industrial scrap are declining.

Boston—Market continues dull. Both export and domestic business is very limited. Machine shop turnings, even at $5 to $6, are not moving. Cast grades are lower, with heavy breakable down $3.

West Coast—Export to Japan is the only activity along the Coast. Domestic activity is virtually nil. In Los Angeles, No. 1 cupola cast is firm and in good demand.

Houston—Prices are unchanged, although further softening is expected. Even now, dealers are reluctant to sell at present levels. The export market is still holding up.

Hamilton, Ont.—Prices in this market are now quoted on **brokers buying prices per net ton on cars.** Those listed this week on p. 168 are on that basis, as were last week's. Prices given in the June 9 issue were incorrectly reported as gross ton prices.

FOR LUSTROUS SPARKLING PRODUCT APPEAL

...*in special coatings for long lasting fine appearance*

MODERN WIRE PACKAGING FOR SPEEDING PRODUCTION

ECONO-COIL®

The single length catch-weight coil that reduces scrap loss and down time in wire fabrication. Continuous length 1500# to 2500#, depending on finish and gage, reduces coil changes, cuts waste.

LEVERPAK or PAYOFFPAK

Modern drum containers protect wire against moisture, dirt; keep wire clean and safe. Handles 500# to 650# catch-weight single length coils, for sizes 14 ga. through 24 gauge. Other sizes on application.

One of these three special finishes may be just the thing to give your product added good looks and high quality appeal. Coppered: Extra smooth finish, for bucket bails, and many items like bag ties, card holders, baggage hooks. Tinned: Unusual brightness and luster, where appearance is important, as in lamp shade frames. Brytite®: Zinc coated wire with the plated look, takes hard turns and twists without flaking or powdering, for chains, display racks, bottle carriers, etc.

Smoothness of surface, lasting luster and uniform workability are hallmarks of Continental Wire, as proved in countless applications. Other finishes, in addition to those above are available, in various tempers and analyses, in low and medium low carbon steel. Your product's sales appeal may depend on Wire-Appeal! Write today for our wire manual.

fine finishes in manufacturers' wire

CONTINENTAL STEEL

CORPORATION KOKOMO, INDIANA

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, BRYTITE, Annealed, Liquor-Finished, Bright, and Special Shaped Wire. Also Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products.

SCRAP PRICES *(Effective June 14, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings.	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate.	39.00 to 40.00
Heavy turnings	27.00 to 28.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	48.00 to 49.00
Rails 2 ft. and under	53.00 to 54.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	41.00 to 42.00
Stainless	
18-8 bundles and solids.	195.00 to 200.00
18-8 turnings	95.00 to 100.00
430 bundles and solids.	105.00 to 110.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	29.00 to 30.00
No. 1 factory bundles	34.00 to 35.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	41.00 to 42.00
Low phos. punch'gs plate, ¼ in. and heavier	35.00 to 36.00
Low phos. 2 ft. and under.	33.00 to 34.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	50.00 to 51.00
Rails 2 ft. and under	49.00 to 50.00
Angles and splice bars	42.00 to 43.00
RR steel car axles	48.00 to 49.00
RR couplers and knuckles	39.00 to 40.00
No. 1 machinery cast.	46.00 to 47.00
Cupola cast.	41.00 to 42.00
Cast iron wheels	32.00 to 33.00
Malleable	44.00 to 45.00
Stove plate	35.00 to 36.00
Steel car wheels	38.00 to 39.00
Stainless	
18-8 bundles and solids.	175.00 to 180.00
18-8 turnings	85.00 to 90.00
430 bundles and solids.	85.00 to 90.00
430 turnings	40.00 to 45.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings.	25.00 to 26.00
Low phos. 5 ft and under.	37.00 to 38.00
Low phos. 2 ft punch'gs.	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	27.00 to 28.00
RR specialties	39.00 to 40.00
Rails, 18 in. and under	56.00 to 57.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	42.00 to 43.00
Malleable	50.00 to 51.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	26.50 to 27.50
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	33.00 to 34.00
Rails, random length	45.00 to 46.00
Rails, 18 in. and under	51.00 to 52.00
No. 1 cupola cast.	36.00 to 37.00
Hvy. breakable cast.	33.00 to 34.00
Drop broken cast.	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	34.00 to 35.00

Cleveland

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	33.00 to 34.00
No. 2 bundles	18.00 to 19.00
No. 1. busheling	30.00 to 31.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	36.00 to 37.00
Drop forge flashings	30.00 to 31.00
Low phos. punch'gs plate.	31.00 to 32.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	33.00 to 34.00
Rails 2 ft. and under	49.00 to 50.00
Rails 18 in. and under	50.00 to 51.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	50.00 to 51.00
Stove plate	39.00 to 40.00
Malleable	47.00 to 48.00
Stainless	
18-8 bundles	190.00 to 195.00
18-8 turnings	85.00 to 90.00
430 bundles	90.00 to 95.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	17.00 to 18.00
No. 1 RR hvy. melting	31.00 to 32.00
Rails, random lengths	37.00 to 38.00
Rails, 18 in. and under	41.00 to 42.00
RR specialties	38.00 to 39.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	37.00 to 38.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	47.00 to 48.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft & under	32.00 to 33.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR hvy. melting	28.00 to 29.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	39.00 to 40.00
No. 1 cupola cast.	47.00 to 48.00
Stove plate	48.00 to 49.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	37.00 to 38.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings.	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	175.00 to 180.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	24.00 to 25.00
Drop forge flashings	24.00 to 25.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Heavy breakable cast.	29.00 to 30.00
Mixed cupola cast.	33.00 to 34.00
Automotive cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	60.00 to 65.00
430 bundles and solids.	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $24.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 24.50
No. 2 bundles	14.00 to 15.00
No. 1 busheling	24.00 to 24.50
Machine shop turn.	5.00 to 6.00
Shoveling turnings	7.50 to 8.50
Clean cast. chem. borings.	13.00 to 14.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast	32.00 to 33.00
Heavy breakable cast.	27.00 to 28.00

San Francisco

No. 1 hvy. melting		$34.00
No. 2 hvy. melting		30.00
No. 1 dealer bundles		30.00
No. 2 bundles		20.00
Machine shop turn.	$14.00 to	15.00
Cast iron borings	14.00 to	15.00
No. 1 cupola cast.		46.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn	15.00
Shoveling turnings	15.00
Cast iron borings	$15.00 to 16.00
Elec. furn. 1 ft and under (foundry)	42.00 to 43.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

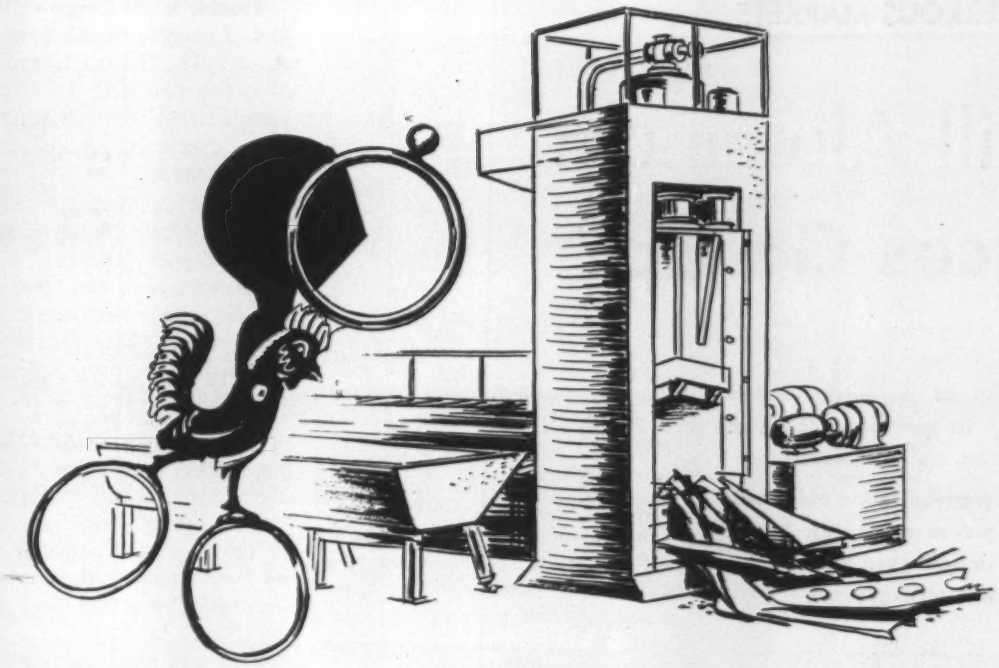
Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$25.80
No. 2 hvy. melting, 2 ft. and under	25.50
No. 1 dealer bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bush., new fact., prep'd	25.50
Bush., new fact., unprep'd	20.45
Machine shop turn.	12.00
Short steel turn.	12.00
Mixed bor. and turn	12.00
Cast scrap	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	12.00
Shoveling turnings	14.00
Cut structural plate 2 ft & under	$40.00 to 41.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast.	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00



for eggshells or scrap iron

Iron scissors shaped like present-day hand sheep shears have been found in France and Germany, from about 250 to 150 B.C. Other scissors have been discovered among the surgical instruments from the ruins of Pompeii and Herculaneum—and in India, they were in use as early as 1600 B.C.

Through the centuries, special-purpose shears have been devised not only for such functions as cutting cloth and hair, but also for opening soft boiled eggs or transplanting seedlings; for pruning, pinking, or lamp trimming. Another model, when closed to form a dagger, was in demand by Persian ladies as a defensive weapon—during the past century.

Today's scissors and shears total 6000 styles, including a giant 1200 ton hydraulic shear for cutting iron and steel scrap. To maintain their production, and for the countless other civilian and military demands for steel, a never-failing flow of scrap must be maintained.

For the purchase or sale of iron or steel scrap . . .

phone or write "Your Chicago Broker"

M. S. KAPLAN COMPANY

231 S. La Salle St., Chicago

Telephone ANdover 3-3900

1960—OUR 50th YEAR

Will Aluminum Prices Go Up?

Pressure of competing metals is likely to prevent aluminum from going up this summer.

But increased labor costs will put a squeeze on prices. Result is likely to be higher prices when the market strengthens.

■ Some of the major aluminum producers still think they should increase prices. Why? To finance the broad market development that has become the trademark of the industry.

But they are not likely to get an increase this year. And they are reconciled to it.

The Reasoning — Last week a spokesman for one major producer reported that the pattern of a price hike following a wage hike would no longer hold. Although many in the trade disagree, this aluminum spokesman insists that this never was consistent enough to be called a pattern.

This apparently means his company does not intend to raise its prices when wage costs go up on August 1, under its union contracts.

And he indicated that he does not expect other producers to raise their prices either.

The Background — One reason for getting away from any pattern of making price follow wages: The aluminum industry in the last few years has been forced to adjust its prices with the competition from other materials. There is no longer a direct relationship between cost and price.

Another indication that prices are not likely to go up: The aluminum company spokesman admitted the producers have enough room to absorb the added labor cost without raising prices.

Not all will agree, however.

But aluminum producers will probably raise prices when the market will stand it. The same source writes off price as the major factor in aluminum's competitive situation.

"Aluminum has made its greatest gains against cheaper materials," he says. And he uses the growth of the aluminum can as the prime example.

Market Factors—The American aluminum producers are now operating at about 84 pct of capacity. And Canada—Aluminium Ltd. primarily—is up around 90 pct. And this is likely to hold for the next few months.

Imports of pig are no longer a factor on the U. S. market. But while imports of semi-fabricated shapes are running 8 pct below 1959, they are still 2½ times over 1957, something to be concerned about.

On the other side of the ledger, pig exports have risen from 7.7 million lb in the first quarter 1957 to over 94 million lb in the first quarter 1960.

Copper

The copper market is a little jittery this week, but prices remain firm.

The earthquakes in Chile were all hundreds of miles away from copper production centers, so output was not affected.

Trouble in the Congo—The only hint of possible trouble comes from Africa. The Belgian Congo is due to become an independent country sometime this summer. More and more, conflicting reports come out of the country.

Belgian authorities see little chance of any trouble when this major copper producing area becomes sovereign. But other sources say the tension has risen to a point near panic. Many Europeans are reported to be hastily sending their families out of the country.

Who's Going — Anti-European newspapers have become louder in their demands and threats in the last few weeks. And there is known to be a list of: Europeans ordered to leave at once; those who must eventually leave; and those who will be allowed to stay.

It is not clear how official this list is. However, any trouble is likely to stop production in the copper mines. While this will not affect U. S. consumers directly for at least a few weeks, there is likely to be a reaction of inventory buying. This would definitely tighten up world copper markets.

Tin prices for the week. June 8 —100.875; June 9—101.25; June 10 — 101.50; June 13 — 101.25; June 14—101.375*.
*Estimates.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.00	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-180	182-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.00	13.00	1/8/60

ALUMINUM: 99% ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 172.

PRECISE TUBING HELPS HANDLE HOT STUFF

Juggling radioactive materials takes a pair of sure hands—sure mechanical hands. Malfunctions cannot be tolerated. All components must adhere to rigid specifications and operate together perfectly. A good application for precise tubing.

We make stainless steel and nickel tubing in mechanical, aircraft, capillary and hypodermic grades in sizes up to 1 inch OD—plus an amazing variety of "specialties" such as super and "exotic" alloys, glass-to-metal sealing alloys and clad metals.

In addition, we produce a vast line of platinum products and chemicals that have been used by industry for over a century.

We are unique because of our ability to *work these metals to such tiny, precise forms.* Bulletin No. 12 describes our tubular products—Catalog No. 5 describes our platinum products. Write for them.

BISHOP

Tubular Products Division **J. BISHOP & CO.** *platinum works* 35 KING STREET, MALVERN, PENNA.

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	⅞-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.12	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb) ..... $1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9%, dollars per troy oz.. $2.25
Iridium, dollars per troy oz. .... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type).. 28.00-29.00
No. 12 alum. (No. 2 grade)... 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)... 25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective June 14, 1960)

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 25.25-26.25
- Grade 2—92-95% 24.00-25.00
- Grade 3—90-92% 23.00-24.00
- Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26¼
- No. 2 copper wire 24¼
- Light copper 22
- *Refinery brass 22¼
- Copper bearing material 21

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26¾
- No. 2 copper wire 23¾
- Light copper 21½
- No. 1 composition 20¼
- No. 1 comp. turnings 19¾
- Hvy. yellow brass solids 15
- Brass pipe 14
- Radiators 16

Aluminum

- Mixed old cast. ..... 13½—14
- Mixed new clips ..... 15 —15½
- Mixed turnings, dry ..... 14 —14½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 22¾—23
- No. 2 copper wire ..... 20½—21
- Light copper ..... 18½—19
- Auto radiators (unsweated).. 12½—13
- No. 1 composition ..... 17 —17½
- No. 1 composition turnings... 15½—16
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass ... 11¾—12¼
- Brass pipe ..... 13½—14
- New soft brass clippings .... 14 —14½
- No. 1 brass rod turnings .... 11½—12

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3½
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.00 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective June 13, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

? Electrogalvanized sheets.

(Effective June 13, 1960)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5, B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective June 13, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	97.3	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.37	9.71	10.16	10.78	8.94	9.63	9.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	.....	.....	.....
Boston**	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	9.65	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.99	[2]0.20	.....	11.39	10.27	10.48	10.07	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia**	.10	8.95	9.70	10.76	10.95	9.30	9.95	9.35	12.05	17.58	16.58	21.68	20.93
Pittsburgh**	.15	8.58	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland**		10.20	12.05	12.35	12.20	10.35	10.80	10.20	16.65	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.99	10.75	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.15	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective June 13, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Discount Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Discount Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective June 13, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Am'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	190	190	9.00	9.675
Atlanta *A8***	175	193	...	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angelas *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville, Is., Pa.	30.75

HAYWARD ELECTRIC MOTOR BUCKETS

Work Longer, Work Faster, Wear Less!

Hook onto any electric over-head crane...need no latches, hand lines, ropes or limit switches...can't discharge accidentally while being traversed...operates without need of circuit breakers...motor enclosed against dust, soot and weather...steel and bronze construction...can operate in pits or high-sided cars...*plus many other cost-cutting design features!*

Write for illustrated bulletin giving complete details including sizes, weights and dimensions.

THE HAYWARD COMPANY
50 CHURCH ST., DEP'T I, NEW YORK 7, N. Y.
Builders of Better Buckets Since 1888

PUZZLED . .

about personnel problems

Dissatisfied with present recruiting methods? The IRON AGE Employment Exchange is the meeting place for employers, and men qualified in all phases of metalworking. For advertising rates, write to Chestnut and 56th Sts., Philadelphia 39.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	10.10	.....	15.35
So. Chicago *R3*	.....	.....	.....	.....	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R2*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S2*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	8.95	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M8*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 48.00
Electrodeposited, 5000 lb lots ... 39.50
Brass, 80-20, ball anodes, 2000 lb or more 53.00
Zinc, ball anodes, 2000 lb lots 20.50
(for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb 1.0225
(Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.40
Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum..... 65.90
Copper sulphate, 25.2 Cu min, 6000 to 12,000 lbs per cwt $13.75
Nickel sulfate, 5000 to 23,000 lbs... 29.00
Nickel chloride, freight allowed, 100 lb 45.00
Sodium cyanide, domestic, f.o.b. Chicago, 200 lb drums 25.00
Zinc cyanide, 100 lb 60.75
Potassium cyanide, 100 lb drum N. Y. 45.50
Chromic acid, flake type, 10,000 lb or more 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R.	11.50
Electrolytic Iron, melting stock, 99.87 pct Fe....	28.75
Carbonyl Iron	88.00
Welding Grades	8.10
Cutting and Scarfing Grades	9.85
Hydrogen reduced, domestic	11.25

Copper Powders

Molding Grades	
Electrolytic, domestic, f.o.b. shipping point.	15.00†
Atomized	46.5 to 64.5
Reduced	15.00†
Chemically Precipitated	15.00†
Brass, 5000-lb lots	35.1 to 52.2
Bronze, 5000-lb lots	53.1 to 56.7
Chromium, electrolytic	5.00
Lead	7.50†
Manganese, electrolytic ...	$1.00
Molybdenum	$3.60 to $4.35
Nickel	$1.15
Carbonyl Nickel, 20,000 lb lots	$1.01
Nickel-Silver, 5000 lb lots..	60.7 to 69.0
Silicon	70.00
Solder	7.00†
Stainless Steel, 316	$1.07
Stainless steel 304	89.00
Tin	14.00†
Titanium, 99.25 + pct, per lb, f.o.b.	$11.25
Tungsten	$3.15 (nominal)

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.29
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*J2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

(Effective June 13, 1960)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky....	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk...	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ⅛ in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
8	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

R. R.
EQUIPMENT
HOPPER TANK CABOOSES
FLATS GONDOLAS BOXES
AND SPECIAL DESIGNS

WE WILL REBUILD
TO YOUR SPECIFICATIONS
OR BUILD NEW
AS REQUIRED

RAIL & INDUSTRIAL
EQUIPMENT CO., Inc.
30 CHURCH STREET
NEW YORK 7, N. Y.
PLANT: LANDISVILLE, PA.

FOR SALE
By
STRUTHERS WELLS CORP.

MACHINE TOOLS

1—36" Bullard Vertical Turret Lathe, 34" table, Max. 24" under rail, 1 Rail, 1 Side Head, Ser. 9083.

2—6'17" Col. American Radial Drills, Ser. No. 43529.

1—Cincinnati 28/120 Horizontal Hydrotel Milling Machine, Ser. 40M-318256-1.

1—Stoker, Combustion Engineering Type E, Class 10, underfeed, 8'4¾" wide x 10'4" long, steam driven. Spare parts included. Used only four months.

CRANES

1—10 Ton P&H O.E.T. CRANE, cab operated. Serial 10422, lift 14'11", span 39'0½", 3 motors, 230 volt D.C.

1—7½ Ton SHAW O.E.T. CRANE, cab operated, Serial 2416. 3½ ton auxiliary hoist, lift 34'1", span 40'0¾", 4 motors, 230 volt D.C.

1—5 Ton SHAW O.E.T. CRANE, cab operated, Serial 1456, Lift 11'2", span 31'8½", 3 motors, 230 volt volt D.C.

ALL THE ABOVE IN GOOD TO EXCELLENT CONDITION
MAY BE INSPECTED UNDER POWER

Write—Wire—Phone

STRUTHERS WELLS CORP.
TITUSVILLE, PENNSYLVANIA

Pittsburgh Sales Are Still Slow

Used machine dealers in the Pittsburgh area are still lagging.

Dealers look at the next 60 days as the critical period in determining the year's business.

■ Pittsburgh dealers find no grounds for optimism. If anything, business is slower than it was two months ago.

With steel mills dominating the market in this area, the sharp decline in operating rates has created general gloom. Dealers say inquiries are down and orders are worse.

Surprise Area — Surprisingly enough, sales of mill equipment are holding up better than general machinery lines. According to one supplier, the year as a whole is turning out very nicely. Inquiries are running about average. Recent sales include a four-high bar mill.

However, the dealer points out that sales of mill equipment are made on a spot basis. One or two good orders can make a prosperous year without indicating any broad trend. At the same time, the dealer says there is a ready market for any good equipment that can be turned up.

Little Interest — This thought is backed by the experience of a supplier of general machinery. This source reports a slowing down of inquiries and orders. Machine tools are attracting little interest. Late model press brakes are always in demand. But the general level of business is slipping.

In this situation, levelers, slitters, coilers and other mill auxiliaries are getting the biggest play. Demand is coming not so much from the big mills but from warehouses and specialty processors. Only explanation seems to be that the steel decline has created a demand for rapid, small-quantity supply.

A supplier of electrical equipment reports lagging business. The steel surge brought a flurry of business in the first quarter. Order volume was short of expectations, even in the peak months.

Light Equipment — Demand for materials handling equipment is still spotty. Suppliers will get a week or so of good business, then fall back again. Interest centers in light, inexpensive equipment — small cranes and conveyors costing about $2000. A few inquiries for heavy cranes are coming through but sales are slow in developing.

"I'm still hopeful," says one supplier. He admits, however, that business in this area will rise or fall with the steel industry.

Critical Period — The next 60 days could be critical in determining the business level for the rest of the year. In both new and used equipment, suppliers report a similar condition. Companies have needs for machinery. They have plans and they are making inquiries.

But the sales slide of basic industry has created a general mood of hesitation. With money appropriated and contracts partially let, one mill has held up two big construction projects. Everyone is waiting to see how bad business will get in the summer.

VARIABLE VOLTAGE DRIVES

3 PHASE 60 CYCLE

Quan.	Size	Description
2	3000 HP	DC MOTORS—525 V. 600 RPM Whse. M.G. Sets—2500 K.W. Whse., 2300/4160 V.
1	2750 HP	DC MOTOR 450 V. 300 RPM Elliott 2200 K.W., Gen. Elec. 3 unit 450 V. DC Gen. with 3000 H.P. 720 RPM, 2300 V. AC Motor and Etc.
1	2250 HP	DC MOTOR 600 V. 400/500 RPM, G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1	1500 HP	DC MOTOR 600 V. 600 RPM Whse. M.G. Set. 1500 K.W. G.E. 13200 V.
1	1500 HP	DC MOTOR 600 V 300/700 RPM Whse. M.G. Set—1500 K.W. G.E. 13,200 V.

For listing of Motors, Generators, Transformers, M.G. Sets, Rectifiers, Mill Motors, etc.

See last week issue.

Write — Phone — Wire

BELYEA COMPANY, Inc.

47 Howell St., Jersey City, N. J.
Tel. Oldfield 3-3334

UNIVERSAL Machinery & Equipment Co.

AMERICA'S LARGEST STOCK OF FOUNDRY EQUIPMENT

ARC MELTING FURNACES

1—250# LECTROMELT—185 KVA
1—500# LECTROMELT—200 KVA
1—1000# SWINDELL
1—2000# SWINDELL—1000 KVA
1—3000# HEROULT, Door Charge—800 KVA
1—11' LECTROMELT TOP CHARGE
1—12' SWINDELL Top Charge—5000 KVA
DETROIT FURNACES—10 lb. to 3000 lb. Cap.

INDUCTION FURNACES

1—20 KW AJAX Spark Gap 17# Melting
1—30 KW VACUUM Melting, Complete—Like New
1—100 KW AJAX Melting Installation—Late

100 KW AJAX Induction Vacuum Melting Unit—NEW

HEAT TREAT FURNACES

1—4'x4'x10' Gas Fired Box
1—7' G. E. Rotary Hearth Electric, 1900°F.
1—36" dia. x 36" deep Electric Recirculating
1—210 KW LINDBERG conveyor type, 1400°F.

CLEANING EQUIPMENT AND GRINDERS

1—20x27 WHEELABRATOR
1—27x36 WHEELABRATOR w/loader *dust*
1—36x42 WHEELABRATOR w/loader *Collectors*
1—48x42 WHEELABRATOR w/loader *available*
1—48x48 WHEELABRATOR w/loader *for all*
1—72" WHEELABRATOR Swing Table *machines*
1—WHEELABRTOR No. 1-A Multi-Table
1—48" WHEELABRATOR Swing Table
1—PANGBORN Pipe Cleaner, 2" to 16" O.D.
1—SAFETY 10 H. Swing Grinder
1—WHITING 26"x54" tumbling barrel

. . . SPECIAL . . .

AETNA-STANDARD single & triple Draw Benches
125 Ton HYDRAULIC PRESS, Down Moving Ram
B&P Motive Jr. Sandslinger—2 speed
3000 Kg. BRINELL Hardness-Tester
15 Ton Double Leg A.C. Gantry Crane

Model 43 LIQUIMATTE wet blasting cabinet, Brand New. Ideal for finishing and cleaning tools, dies, molds, etc. at 50% SAVINGS.

1630 NORTH NINTH ST. READING, PA. PHONE FRANKLIN 3-5103

CRANES

BOUGHT & SOLD

ENGINEERED TO YOUR REQUIREMENTS

Ornitz Equipment Corp.

Industrial Engineering Service
595 Bergen St. Brooklyn 38, N. Y.
NEvins 8-3566

IMMEDIATELY AVAILABLE

Because of Mill Consolidation

3 LEE WILSON RECTANGULAR BELL-TYPE ANNEALING FURNACES

atmosphere-controlled with 9 bases, are available. Each is approximately 7' x 7' x 14'. Excellent when used for manufacture of steel coils, they have a capacity of 50 tons per charge. These top-grade furnaces are still set up in the plant. Tremendous values specially priced for prompt sale.

NATIONAL MACHINERY EXCHANGE

126 Mott St. New York 13, N. Y.
CAnal 6-2470

Keep 'em rolling . . . not rusting

FOR SALE

New—Used—Reconditioned railroad freight cars • car parts • locomotives • tank cars • steel storage tanks.

MARSHALL RAILWAY EQUIPMENT Corporation

328 Connell Building, Scranton 3, Pennsylvania
Diamond 3-1117 Cable MARAILQUIP

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

Qu.	KW	Make	D.C. Volts	A.C. Volts
1	3500	Al.Ch. (3-unit)	350	13800/4160
1	3000	Al.Ch. (3-unit)	600	13800/4160
1	2400	G.E.	300	4580/2300
1	1520	S.&.S. (3-unit)	600	2300
1	1500	G.E.	250	4600/2300
1	1325	Whse.	600	2280
1	1250	G.E.	132/265	4160
1	1060	S.&S.	600	2300
2	500	G.E.	250	4160/2400
1	350	G.E.	250	4000/2300
1	300	Al.Ch. (3-unit)	250	2300
1	300	G.E.	250	4000/2300
3	250	Whse.	250	4000/2300
2	200	G.E.	250/275	4000/2300
2	150	G.E.	250	440
1	150	Reliance	125	2300
1	125	G.E.	250	2300/440
1	100	G.E.	250	4000/2200
1	75	G.E.	250	2300/440

DIRECT CURRENT MOTORS
Adjustable and Constant Speed
(Suitable for MILL and STANDARD DUTY)

Qu.	H.P.	Make	Volts	R.P.M.
1	3000	G.E.	600	90/180
2—N.*	3000	Whse.	600	600
2—N.*	2700	G.E.	415	280
1—N.*	2500	Whse.	700	108/162
1—N.*	2200	Whse.	600	92/132
2—N.*	2000	G.E.	350	230/350
2—N.*	1750	G.E.	600	200/300
1— *	1500	Al.Chal.	600	120/240
3—N.*	1500	Whse.	600	165/300
2—N.*	1400	G.E.	250	165/300
6—N.*	750	Whse.	250	300/700
1	750	Whse.	250	300/600
2— *	650	S.&S.	300	1000/1350
2	600	Al.Chal.	600	300/600
1	600	Whse.	250	110/220
2	300	Whse	230	300/600
2	225	Whse.	230	325/975
1	150	Whse.	230	400/1200
1	125	Whse.	230	450/1050
3	125	Whse.	230	350/1125
1—N.*	100	Whse.	250	350/700

N—New and unused.
*—Enclosed forced ventilated.

(1)—1250-KVA Whse. Hi-Cycle Frequency Set, 900-V., 960 cycle with 1875-HP syn. motor, 2300-V., 3 ph., 60 cy. with all switchgear.

T. B. MAC CABE COMPANY

4302 Clarissa St., Philadelphia 40, Penna.
Cable Address "Macsteel" Philadelphia, Pa. Phone Davenport 4-8300

AMERICA'S CRANE REBUILDING SERVICE LARGEST

- ANY CRANE CAN BE MODERNIZED TO THE MOST EXACTING SPECIFICATIONS
- MECHANICAL & ELECTRICAL RECONDITIONING
- BRIDGE SPANS & HEADROOM ALTERED
- OVER 100 USED CRANES AVAILABLE
- MANUFACTURERS OF SlenTorque CRANES

POLLOCK INDUSTRIES, INC.

SOUTH KEIM STREET, POTTSTOWN, PA. FAculty 3-5500

eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

HORIZONTAL DRILLS

2 spindle No. 410 W. F. & John Barnes, m.d.
No. 410 W. F. & John Barnes, Horizontal Boring & Drilling Machine, m.d.
No. 410 Barnes Single Spindle Deep Hole
No. 2 Avey Style MA1, with horizontal operation
No. 1/2Bx50" Pratt & Whitney Gun Barrel Rifling, Model M1821, m.d., latest
No. 1½"x105" Pratt & Whitney, 2 spindle Hydraulic Deep Hole Drill, Model 973 m.d., latest
No. 1½"x105" Pratt & Whitney, Model M1825, 2 spindle Gun Barrel Rifling, m.d.
No. 1 Model M509 Pratt & Whitney, 2 spindle Deep Hole Drill, belted m.d.
¾"x40" Bausch Double Horizontal Drilling Machine, m.d.
No. 445 W. F. & John Barnes Independent 2 spindle Deep Hole Drill & Boring Machine, late
No. 2F1 Natco Horizontal Boring & Drilling Machine Natco, Holesteel Model, m.d.
Natco Horizontal Drill, 2 opposed B4F2 Head, 1943
No. 2 LeBlond Deep Hole Borer, m.d., 1943

MULTIPLE SPINDLE DRILLS

2 spindle No. 201¼ Barnes, m.d., H.D.
2 spindle No. 6 Colburn Manufacturing Type H.D., separate m.d. to ea. spindle
3 spindle 28" Cincinnati-Bickford Upright Drill, m.d., No. 4 M.T.
4 spindle No. 201¼ Barnes H.D., m.d.
6 spindle Model M1613 Pratt & Whitney In Line Vertical Drill
6 spindle W. F. & John Barnes Vertical Drilling Machine, m.d.
No. 924 Barnes Vertical Boring, Drilling, Facing & Reaming Machine

UPRIGHT DRILLS

Model H3 Barnes Hydram, m.d.
Model H4 Barnes Hydram, m.d.
20" Barnes, m.d., 1940
20" Barnes All Geared Self-Oiling Drill & Tapper, m.d.
21" Cincinnati-Bickford, single spindle, m.d.
21" Cincinnati-Bickford, H.D., m.d., late
24" Cincinnati-Bickford, H.D., Super Service, m.d.
No. 2AL Natco Holesteel Vertical, m.d.
No. 20¼ Barnes Single Sp. Upright Drill & Tapper, m.d.
No. 314A Baker Universal Quick Change Type, H.D., m.d.
No. 513 Baker, m.d., belted m.d.
6 spindle Barnes, m.d.

GEAR GRINDING MACHINES

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times

THE EASTERN MACHINERY COMPANY

1002 Tennessee Avenue, Cincinnati 29, Ohio

MElrose 1-1241 CABLE ADDRESS—EMCO

COMPRESSORS

No better values at any price

100 CFM	100 psi	8 x 7 Ing. or Worth.
128 CFM	100 psi	7 x 7 Ing.—CPT—Worth.
142 CFM	125 psi	Ingersoll Rand Type 40-Jaeger
183 CFM	150 psi	7 x 7 Joy WG8
191 CFM	300 psi	9-4¼ x 9 ES-2
194 CFM	125 psi	7-7-8 x 5 Worth. M40
254 CFM	100 psi	9 x 9 Ing.—Worth. Chic Penn
290 CFM	75 psi	10 x 9 Ing. ES-1
364 CFM	100 psi	10 x 9 Joy WG9
465 CFM	100 psi	12 x 11 IR—Amer.
502 CFM	125 psi	12 x 13 Ing. Rand.
585 CFM	100 psi	15-9¼ x 12 Ing.
660 CFM	125 psi	11½ x 7 x 7 Joy WN 102
670 CFM	100 psi	15-9¼ x 12 Ing. XRB
698 CFM	100 psi	14 x 15 IR—CPT
877 CFM	125 psi	17/10½ x 14—IR—XRB
1721 CFM	100 psi	23-14x18 Ing. PRE-2
	285 hp.	GE-TS Syn. Motor 3/60/2300 See it running
2508 CFM	50 psi	19/19 x 14 Penn—DE—I
	300 hp.	Em syn. Motor 3/60/2300
Portable Gas-diesel	60"-600'	

AMERICAN AIR COMPRESSOR CORP.
DELL AND IRON STREETS
NORTH BERGEN, N. J.
Telephone UNion 3-4848

ROLLING MILLS
Sale or lease

18" x 30" COLD STRIP, 2 HI.
12" x 12" COLD STRIP, 2 HI.
10" x 26" COLD FOIL, MILL 2 HI.
5 Stand 10" MERCHANT BAR MILL
18" x 72" HOT BREAKDOWN, 2 HI.
20" x 72" HOT BREAKDOWN, 3 HI.
CANTON; #1½ Alligator shear 12" blades, 5Hp. motor.

SOAKING FURNACES & REDUCTION UNITS

SEABOARD ENGINEERING CO.
7 Van Winkle St., Bloomfield, N. J.
PILGRIM 8-1169

LIFTING MAGNETS

A complete magnet service. Magnets, new & rebuilt, generators, controllers, reels, etc.

Magnet specialists since 1910

Goodman Electric Machinery Co.
1060 Broad St. Newark 2, N. J.

SALE OR RENT

25 & 45 Ton G.E. Diesel Electric Locomotives
1—65 Ton Porter Diesel Electric Locomotive
1—Betts-Bridgeford Axle Lathe
30 & 40 Ton Diesel Locomotive Cranes
1—500 KW Diesel Generator, 2300 volts, Slow Speed. New 1950

B. M. WEISS COMPANY
Girard Trust Bldg. Philadelphia 2, Pa.

UPSETTERS—
National Air Clutch, 1½", 2", 4"
HAMMERS—
Two 1,000 lb. Chambersburg Model J-2 Board Drop
3,000 lb. Chambersburg Ceco Drop Air Lift, practically new
2500 lb. Model F Board Drop
3500 lb. Erie Double Frame Steam Forging Hammer

DONAHUE STEEL PRODUCTS COMPANY
1919 W. 74th St. Chicago 36, Ill.

PLANT DISMANTLING & LIQUIDATION

Surplus Equipment & Inventories Purchased

CURRY & HUDSON ASSOCIATES, INC.
Gateway Center, Pittsburgh 22, Pennsylvania

FOR SALE OR RENT

1500 HP Alco Diesel Electric Switcher Locomotives. New 1949. Excellent Condition. 7 Available.
44 Ton Gen. Elec. Diesel Elec. Loco. Cummins 190 HP Engine. 4 Traction Motors. Rebuilt.
25 Ton Gen. Elec. Diesel Elec. Loco. New 1942. Cummins Engine.
40 Ton Ind. Brownhoist Diesel Loco. Crane. New 1946. Caterpillar Eng.
25 Ton Ind. Brownhoist #5 Diesel Loco. Crane. New 1941. Cat. Eng. Recond.
60 Ton Link-Belt K-595 Lifting Crane. 120' Boom. Cat D-17000 Diesel.

WHISLER EQUIPMENT CO.
1910 Railway Exchange Bldg., St. Louis 1, Mo.
CHestnut 1-4474

Lou F. Kinderman

P. O. Box 182, Niles, Ohio OLympic 2-9876

FOR SALE

1—34" U.E. & F. Co. Roll Lathe, 44" swing, will turn rolls up to 16' 6" in length. 230 volt DC.
4—75 Ton Open Hearth Melting Furnaces, with ladle crane, ladles, charging boxes, charging box cars, controls and accessories.
1—125 Ton Morgan Ladle Crane, 4 girder, 85' 10" span, 230 volt DC, cab operated.
1—50 Ton Alliance Crane, 10 Ton auxiliary, 57' span, 4 motor, 230 volt DC, cab operated, 32' lift, Fishbelly girders.
2—15 Ton Alliance Soaking Pit Cranes, 86' span, cab operated 230 volt DC, E.C. & M. Controls.

OFFERING

BRIDGE CRANES

ARNOLD HUGHES COMPANY
2765 PENOBSCOT BLDG. DETROIT, MICH.
WOodward 1-1894

PRESSES
BRAKES SHEARS

Will Lease or Furnish Long Terms

JOSEPH HYMAN & SONS
2600 E. Tioga St., Philadelphia 34, Pa.

OUTDOOR TRAVELING BRIDGE CRANES FOR SALE—(2) 15 tons capacity 50 ft. cross travel. Designed for elevated trackway spaced 62' 9"

A. JAY HOFMANN COMPANY
NARBERTH, PENNA. MO 4-4433

RAILWAY EQUIPMENT

USED and RECONDITIONED

RAILWAY CARS and REPAIR PARTS

FLAT CARS
4—50-Ton Capacity, 43' long
Steel Underframe

30—Used, All-Steel
30-Cubic Yard, 50-Ton Capacity
MAGOR AIR DUMP CARS
Excellent Condition—Immediate Delivery

DIESEL-ELECTRIC LOCOMOTIVES
1, G. E. 25-Ton, 150 H.P., Std. Ga.
3, G. E. 44-Ton, 400 H.P., Std. Ga.
1, G. E. 80-Ton, 500 H.P., Std. Ga.
1, 125-Ton RAILROAD TRACK SCALE

IRON & STEEL PRODUCTS, INC.

13496 S. Brainard Ave
Chicago 33, Ill.
Ph: Mitchell 6-1212

51-8 E. 42nd St.
New York 17, N. Y.
Ph: YUkon 6-4766

OVER 1,600 NEW AND USED MACHINE TOOLS IN STOCK
WRITE FOR LATEST STOCK LIST

MILES MACHINERY COMPANY
2011 EAST GENESEE • SAGINAW, MICH. PL. 7-3105

FOR SALE
DIRECT ARC MELTING FURNACES
COMPLETE INSTALLATIONS

LECTROMELT—SIZE "S"
1000#/Hr. Rating Door Charge, 500 KVA Transformer, 25000 V Primary, Controls, Switchgear and Spares.

LECTROMELT—SIZE "U"
250#/Hr. Rating Door Charge, 300 KVA Transformer, 25000 V Primary, Controls, Switchgear and Spares.

BOX H-78
c/o The IRON AGE, Chestnut at 56th, Phila. 39

FOR SALE

BAR SHEAR

Complete with conveyor
Model CGC 100G
Fully Automatic
Max. Capacity 4½" Rounds
4" Square

Built 1959
Brand New Condition

PATHEX, INC.
420/430 Main St., Buffalo 2, N. Y.
MAdison 7033

EMPLOYMENT EXCHANGE

Help Wanted

Production Manager and Estimator with pipe fabrication experience. Please reply with full particulars to

BOX H-75
c/o The IRON AGE, Chestnut at 56th, Phila. 39

Employment Service

HIGH GRADE MEN—Salaries $5,000 to $25,000. Since 1915 thousands of Manufacturing Executives, Engineers, Sales Managers, Comptrollers, Accountants and other men of equal calibre have used successfully our confidential service in presenting their qualifications to employers. We handle all negotiations. Submit record with inquiry. The National Business Bourse, 20 W. Jackson Blvd., Chicago.

Situation Wanted

Sales or Marketing Manager—12 years experience in a metals rolling mill and a large branch metals distributor. Substantial accomplishments in all functions of marketing and sales, all levels. Resume available. Box H-71, care of The IRON AGE, Chestnut at 56th, Phila. 39.

Nepsco
NEW ENGLAND
PRESSED STEEL COMPANY
Contract Manufacturer since 1914
METAL STAMPINGS
SPECIALTIES—APPLIANCES
For Industrial and Domestic Users
P. O. BOX 29
NATICK MASSACHUSETTS

K
SINCE 1895
DROP FORGINGS
Small drop forgings up to one pound in size. Inquiries invited for very prompt action.
KEYSTONE FORGING COMPANY
Northumberland Pennsylvania GReenwood 3-3525

THE FORMULA:
Multi-operation presses
plus
Yankee skilled workmen
over
Eighty years manufacturing
know-how equals
Low cost metal stampings
And precision assemblies
To meet your needs
The GREIST MANUFACTURING CO.
646 Blake St., New Haven 15, Conn.

STA-FAST STEEL WEDGES

sharp edges give holding power like a screw. Self-Aligning Steel Belt Fasteners.
Standard Steel Rivets used with Self-Aligning Fasteners.
STAMPINGS PUNCHINGS WASHERS
to your specifications
Catalog sent upon request
SALING MANUFACTURING COMPANY
Standard-Belt-Fastener Division
UNIONVILLE, CONNECTICUT

SPECIFY MEEHANITE CASTINGS FOR MAXIMUM SERVICE
SPECIAL TYPES FOR RESISTANCE TO ABRASION • HEAT • WEAR • CORROSION
AS CAST OR MACHINED.
Weights: 1—60,000 lbs.
ROSEDALE
FOUNDRY & MACHINE CO.
1731 Preble Avenue • Pittsburgh 33, Pa.
Telephone: CEdar 1-1007

DROP FORGINGS
To Your Specifications
Prompt Quotations
BALDT ANCHOR CHAIN & FORGE DIVISION
P. O. Box 350—Chester, Pennsylvania

METAL STAMPINGS
Send your blueprints for our prompt quotation. Latest brochure sent upon request.
CARLSTROM PRESSED METAL CO., INC.
58 Fisher Street Westboro, Mass

DROP FORGINGS
Special Forgings—High Quality, Fast Delivery. For prompt attention phone or send prints to John Bello.
CARCO INDUSTRIES, INC.
7341 Tulip Street, Phila. 35, Pa.
DEvonshire 2-1200

Special Washers
We carry in stock Silicon killed steel specially suited for case - hardening. Stock dies for producing washers from .0015 to ½" thick.
Thomas Smith Company
294 Grove St., Worcester, Mass.

SPECIAL MACHINERY
DIAMITE *Abrasive Resistant* Castings
NI-RESIST *Heat & Corrosion Resistant* Castings
P M G BRONZE *High Strength Acid Resistant* Castings
Fully Equipped—Pattern Foundry & Machine Shop Facilities—Castings to 15 tons
Weatherly Foundry & Mfg. Co., Weatherly, Pa.

DROP FORGINGS
Special Forgings of Every Description. We solicit your prints or model for quotation.
Wilcox Forging Corporation
Mechanicsburg Penna.

EQUIPMENT AND MATERIALS WANTED

WANTED
SURPLUS STEEL
WALLACK BROTHERS
7400 S. Damen Ave. Chicago 36, Illinois
GROVEHILL 6-7474

WANTED TO PURCHASE
any quantity
CARBON—ALLOY—STAINLESS
Bars—Billets—Sheet—Plate
THE GILBERT MERRILL STEEL CORP.
244 Mineola Blvd. Pioneer 7-6200 Mineola, N. Y.

LARGEST BUYERS
in any quantities
OF SURPLUS—NEW & USED
Structurals—All Types of Steel
Pipe—Tubing—Tanks—Boilers
CALUMET IRON & SUPPLY CO.
115 W. Chicago Ave. East Chicago, Ind.

WEISS STEEL CO. INC.
600 WEST JACKSON BLVD.
CHICAGO 6, ILLINOIS
Buyers of Surplus Steel Inventories
39 Years of Steel Service

WANTED
BRIDGE CRANES
ARNOLD HUGHES COMPANY
2765 PENOBSCOT BLDG. DETROIT, MICH.
WOodward 1-1894

SURPLUS STEEL
NEW *WANTED* USED
Structurals, Plate, Pipe and Tubing
Consumers Steel & Supply Co.
P. O. Box 270, RACINE, WISCONSIN

ADVERTISERS IN THIS ISSUE

An asterisk indicates that a booklet, or other information, is offered in the advertisement.

This index is published as a convenience. No liability is assumed for errors or omissions.

A

Aetna Life Insurance Co..... 36
Alan Wood Steel Co..... 160
*Allegheny Ludlum Steel Corp... 4
*Allis-Chalmers 102
*Allison-Campbell Div., American Chain & Cable Co., Inc. 12
*All-State Welding Alloys Co., Inc. 146
American Air Compressor Corp. 182
*American Chain & Cable Co., Inc., Allison-Campbell Div. 12
American Chain Div., American Chain & Cable Co., Inc..... 72
*American Gas Furnace Co..... 57
American Optical Co. 28
Anaconda Aluminum Co. 37
*Armco Steel Corp. 6

B

Baldt Anchor, Chain & Forge Div. 183
Bausch & Lomb 60
Belyea Co., Inc. 181
Bethlehem Steel Co. 1, 112-113
*Bishop, J., & Co..... 171
Blaw-Knox Co., Foundry & Mill Machinery Div. 23
Budd Co., Electronic Controls Section 50
*Buffalo Forge Co. 25

C

Calumet Iron & Supply Co..... 183
Carco Industries, Inc. 103
*Carlson, G. O., Inc..... 107
Carlstrom Pressed Metal Co..... 183
Carpenter Steel Co. 17-22
*Chatillon, John, & Sons..... 138
Clymer Associates, Inc. 147
*Coffing Hoist Div., Duff-Norton Co. 137
Columbia-Southern Chemical Corp. 140
*Commercial Shearing & Stamping Co. 10
*Commonwealth of Pa., Dept. of Commerce 156
Cone-Drive Gears Div., Michigan Tool Co. 146
Consumers Steel & Supply Co.... 183
*Continental Steel Corp. 167
*Copperweld Steel Co., Aristoloy Steel Div.....Inside Front Cover
Copperweld Steel Co., Ohio Seamless Tube Div..... 80
Crucible Steel Co. of America..48-49
Curry & Hudson Associates, Inc... 182
Cutler-Hammer, Inc.....Back Cover

D

*Danly Machine Specialties, Inc... 104
*Delta Power Tool Div., Rockwell Mfg. Co. 153
Detecto Scales, Inc. 147
Donahue Steel Products Co..... 182
*Drop Forging Association 51
*Duff-Norton Co., Coffing Hoist Div. 137

E

Eastern Machinery Co. 181
*Eastern Stainless Steel Corp....76-77
*Easton Car & Construction Co... 157
*Elastic Stop Nut Corp. of America 61
Electro Lift, Inc. 158
Erie Bolt & Nut Co..... 154

F

*Federal Bearings Co., Inc..... 43
Federal-Mogul Service Div. of Federal-Mogul-Bower Bearings, Inc. 35
Ferry Cap & Set Screw Co..... 32
Finkl, A., & Sons Co..... 114
*Foote Bros. Gear & Machine Corp. 78
*Foote Mineral Co. 14
Fuller Co. 56

G

Garlock Packing Co. 44-45
Gilbert Merrill Steel Corp..... 183
Goodman Electric Machinery Co. 182
*Goodyear Tire & Rubber Co., Industrial Products Div. 26-27
Goss & DeLeeuw Machine Co..... 184
Greist Manufacturing Co. 183

H

*Hayes, C. I., Inc..... 11
*Hayward Co. 178
Hoffman, A. Jay 182
*Hooker Chemical Corp. 159
Hughes, Arnold, Co. 182, 183
Hyde Park Foundry & Machine Co. 136
Hyman, Joseph, & Sons..... 182
*Hyster Co., Industrial Truck Div. 118

I

*Inductotherm Corp. 152
Iron & Steel Products, Inc..... 182

J

Jones & Laughlin Steel Corp., Stainless & Strip Div.....150-151

K

Kaiser Engineers 39
Kaplan, M. S., Co..... 169
*Kemp, C. M., Mfg. Co..... 33
Keystone Forging Co. 183
Keystone Steel & Wire Co..... 91
*Kidde, Walter, & Co., Inc..... 15
Kinderman, Lou F. 182

L

*Leeds & Northrup Co..... 54
Lees-Bradner Co. 139
*Lucas Machine Div., New Britain Machine Co.....73-74

M

MacCabe, T. B., Co..... 181
Machine Tool Exposition 24
Mackintosh-Hemphill Div., E. W. Bliss Co. 69
*Mahon, R. C., Co..... 163
*Maine Department of Economic Development 110
*Marathon Industries, Inc. 158
*Marchant, Geo. F., Co..... 165
Marshall Railway Equip. Corp... 181
Michigan Tool Co., Cone-Drive Gears Div. 146
Miles Machinery Co. 182
*Milford Rivet & Machine Co... 147
*Molybdenum Corp. of America 42
*Morgan Construction Co. 5

N

National Acme Co. 66-67
National Business Bourse, Inc..... 182
National Machine Tool Builders Assoc. 24
National Machinery Exchange .. 181
National Steel Corp. 65
*Nebel Machine Tool Corp..... 29
*New Britain Machine Co., Lucas Machine Div. 73-74
New England Pressed Steel Co... 183
Norton Company, Abrasive Grain Div. 75
*Norton Co., Refractories Div.... 135

O

*Oakite Products, Inc. 155
Ohio Seamless Tube Div., Copperweld Steel Co. 80
Olin Mathieson Chemical Corp., Metals Div. 47
Ornitz Equipment Corp. 181

P

Pangborn Corp. 62-63
Parker Rust Proof Co. 58-59
Pathex, Inc. 182
Pittsburgh Steel Co. 40-41
Pollock Industries, Inc. 181
*Protectoseal Co. 156

R

*R-S Furnace Co., Inc..... 13
Rail & Industrial Equip. Co., Inc. 180
*Ready-Power Co. 16
*Republic Steel Corp. 30-31
Revere Copper & Brass, Inc..... 111
*Reynolds Metals Co. 52-53
*Rockwell Manufacturing Co., Delta Power Tool Div..... 153
*Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp.... 71
Rosedale Foundry & Machine Co. 183
Ryerson, Jos. T., & Son, Inc..... 8

S

Saint Joseph Lead Co..... 68
Saling Manufacturing Co. 183
Seaboard Engrg. Co. 182
*Sherwin-Williams Co. 99
*Signode Steel Strapping Co.... 100
*Simonds Abrasive Co. 46
Smith, A. O., Corp..... 153
Smith, Thomas, Co. 183
*Steel & Tube Div., Timken Roller Bearing Co..... 94
Struthers Wells Corp. 180
*Synthane Corp. 64

T

*Timken Roller Bearing Co., Steel & Tube Div. 94
Trabon Engineering Corp. Inside Back Cover

U

*Uddeholm Co. of America, Inc. 34
Udylite Corp. 96
United States Rubber Co., Mechanical Goods Div. 149
Universal Machinery & Equipment Co. 181

V

Vanadium Corp. of America..... 38
*Vascoloy-Ramet Corp. 70

W

Wallack Bros. 183
*Wean Equipment Corp. 108
Weatherly Foundry & Mfg. Co... 183
Weirton Steel Co. 65
Weiss, B. M., Co..... 182
Weiss Steel Co., Inc. 183
Westinghouse Electric Corp. ..115-117
*Wheelabrator Corp. 144-145
Wheland Co. 92
Whisler Equipment Co. 182
Wilcox Forging Corp. 183

Y

Youngstown Sheet & Tube Co.... 55

CLASSIFIED SECTION

Clearing House 180-182
Contract Manufacturing 183
Employment Exchange 182
Equipment & Materials Wanted.. 183

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

TRABON®

CENTRALIZED LUBRICATING SYSTEMS

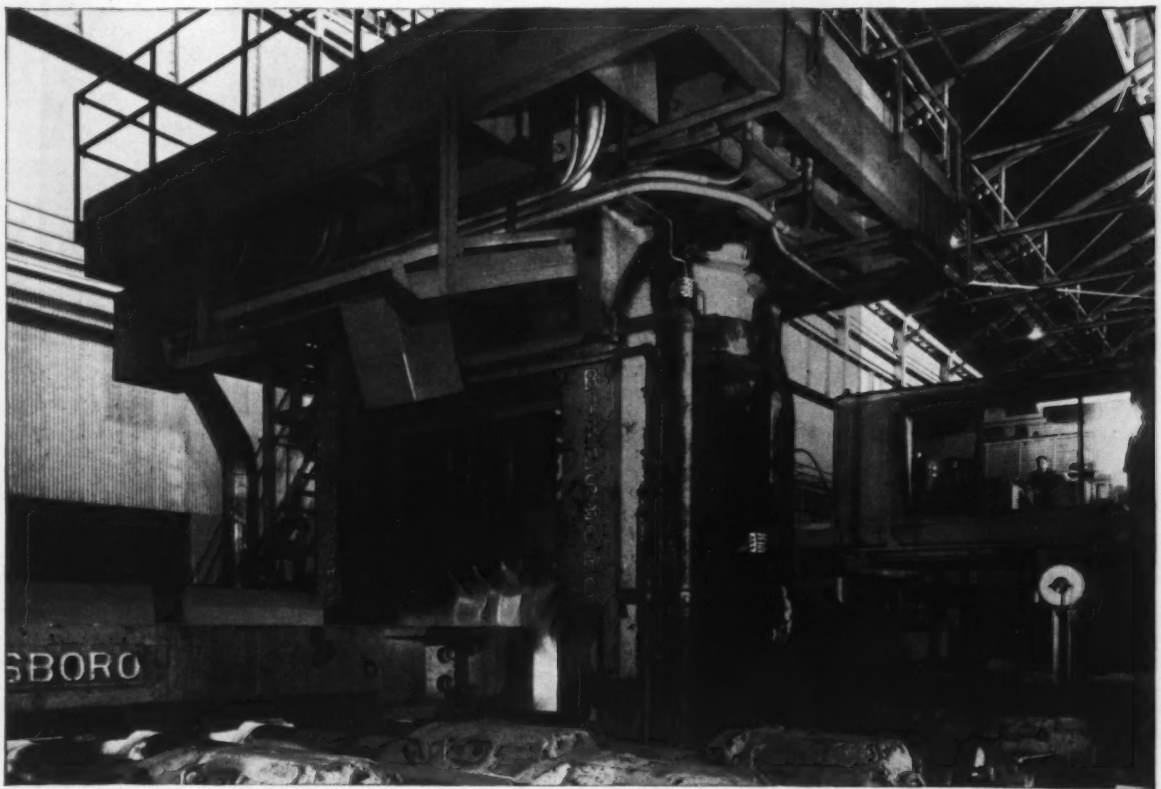
1/3 of a mile of brand-new, ultra modern steel mill at U. S. Steel's Duquesne Works is equipped with Trabon automatic centralized lubricating systems.

33 "original container" barrel pumps, each with its own automatic control and central warning system, serve the components of this tremendous new facility.

Included are the Mesta 45″ slabbing mill and shear, Birdsboro 36″ blooming mill and shear, United 21″ billet mill and traveling hot saws, Morgan flying shear, Linde Descarfer, Morgan, Alliance and Cleveland cranes, ingot buggy, tables and accessory equipment. It is indeed significant that the designers of this fine new mill selected Trabon.

In buying new or rehabilitating old machinery don't overlook the importance of a good lubricating system. When you specify Trabon — you get the best!

4522 Bearings at U. S. Steel's Duquesne Works expansion protected by TRABON



The new 36″ Birdsboro Blooming Mill is served by a Trabon heavy-duty Type MX System — *completely automatic — completely positive — and providing immediate central warning* at the control panel. Reset indicators in all valves quickly pinpoint trouble when central warning is given.

"Centralized" OIL AND GREASE SYSTEMS "Meterflo" CIRCULATING OIL SYSTEMS "Meter-Mist" OIL SYSTEMS

Trabon® **Trabon Engineering Corporation** 28815 Aurora Road • Solon 39, Ohio

New! The most reliable limit switch ever developed

(from Cutler-Hammer, of course)

Limit switch failures cause more production down time than any other electrical component. Suddenly this problem has been greatly reduced by Cutler-Hammer's new oiltight limit switch. Under test conditions so tough they'd never be equalled in actual service, it lasted far longer than any other limit switch.

It fits almost anywhere and in any position. A simple field adjustment changes switch operation to close the contacts by lever motion that is clockwise, counterclockwise, or both. And, no other switch is sealed more effectively. Even the silver-to-silver contacts are visible for quick inspection. Send for Pub. ED143-L246 now for full details.

WHAT'S NEW AT CUTLER-HAMMER?

We're planning ahead—with new, *better* products, like the limit switch. We've added plant capacity, new engineering talent and our new trademark symbolizes our new capabilities to help you plan ahead. Call the nearest Cutler-Hammer sales office or distributor to see how we can fit into your team.

WHAT'S NEW? ASK...

CUTLER-HAMMER

CONTROL

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.